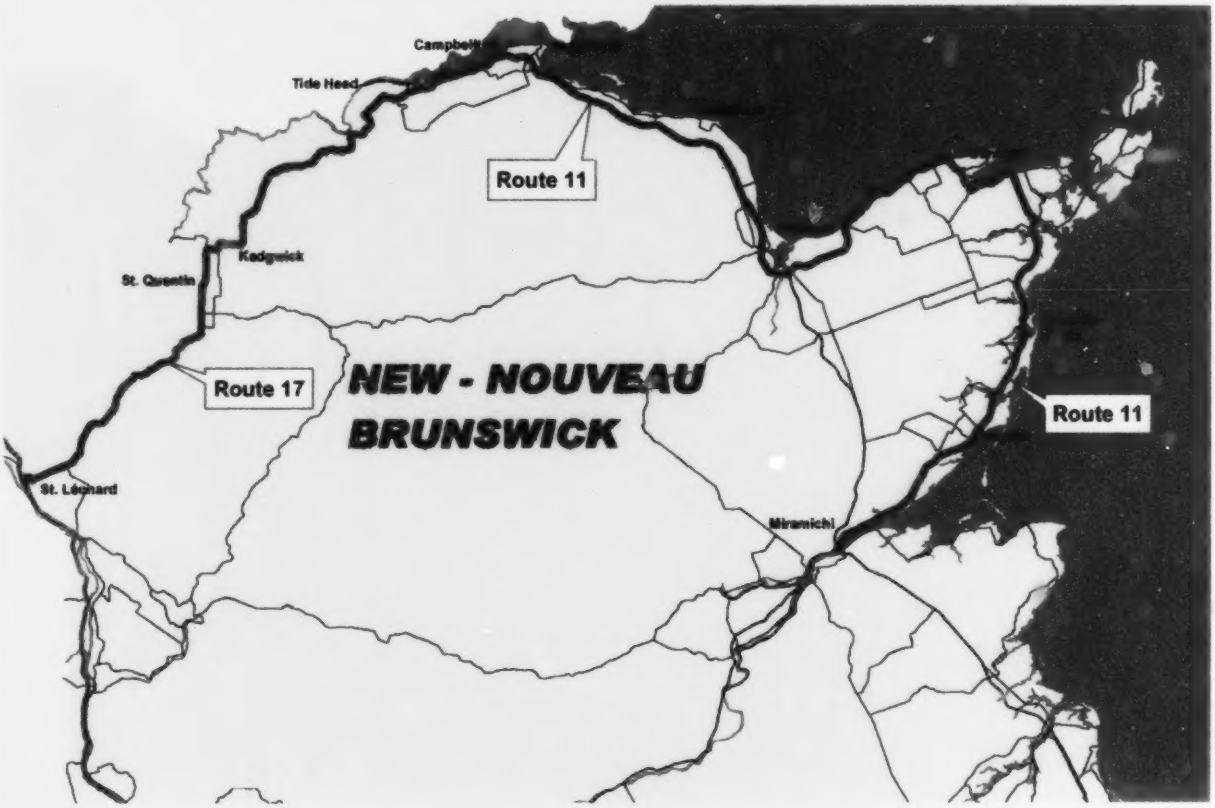
New Nouveau
Brunswick

DEPARTMENT OF TRANSPORTATION

ROUTE 11 AND ROUTE 17 NEEDS STUDY

Miramichi to Saint-Léonard


Campbellt
Tide Head
Route 11
Kedgwick
St. Quentin
Route 17
NEW - NOUVEAU BRUNSWICK
Route 11
St. Léonard
Miramichi

Report

Submitted by :

Boissonnault
McGraw

and

GROUPE
ROY CONSULTANTS
GROUP

Sept., 2003

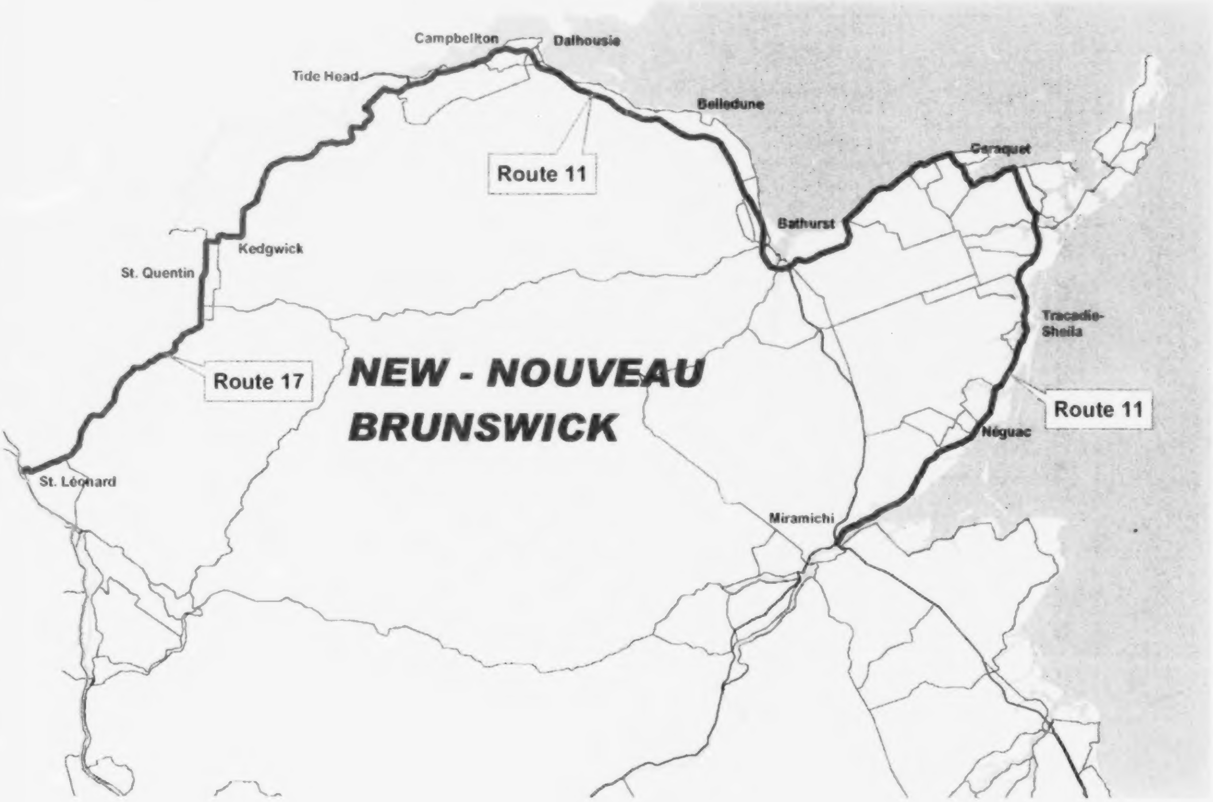
104-00370/

New Nouveau
Brunswick

DEPARTMENT OF TRANSPORTATION

ROUTE 11 AND ROUTE 17 NEEDS STUDY

Miramichi to Saint-Léonard


Campbellton
Dalhousie
Tide Head
Belledune
Route 11
Caraquet
Bathurst
Kedgwick
St. Quentin
Tracadie-Sheila
Route 17
NEW - NOUVEAU BRUNSWICK
Route 11
Néguac
St. Léonard
Miramichi

Report

Submitted by :

Boissonnault McGraw and GROUPE **ROY CONSULTANTS** GROUP

Sept., 2003

Table of Contents

Table of Contents i

List of Tables iii

List of Figures v

List of Abbreviations vi

Executive Summary vii

1.0 INTRODUCTION 1
  1.1 Background 1
    1.1.1 Route 11 - Acadian Peninsula 3
    1.1.2 Route 11 - Bathurst to Tide Head 3
    1.1.3 Route 17 - Tide Head to Saint-Léonard 4
    1.1.4 Provincial Traffic Volumes 4
  1.2 Project Purpose 5
  1.3 Scope of Analysis 5

2.0 STUDY APPROACH 6
  2.1 Route Segmentation 6
  2.2 Evaluation Criteria 6
  2.3 Data Collection 8
  2.4 Data Analysis 8
  2.5 Prioritization 8
  2.6 Upgrading Strategies 9
  2.7 Cost Determination 9

Table of Contents (cont'd)

3.0 NETWORK ANALYSIS **11**
- **3.1 Collision Rate (safety indicator)** **11**
- **3.2 Passing Restrictions (service indicator)** **14**
- **3.3 Traffic Volumes (economic indicator)** **17**
- **3.4 Surface and Shoulder Widths, Horizontal and Vertical Alignments (geometric indicator)** **20**
- **3.5 Posted Speed (travel time indicator)** **23**
- **3.6 Overall Summary of Criteria Results** **26**

4.0 IMPROVEMENT STRATEGIES **31**
- **4.1 Correct Deficiencies along Existing Alignment** **31**
  - **4.1.1 Route 11 - Acadian Peninsula** **32**
  - **4.1.2 Route 11 – Bathurst to Tide Head** **40**
  - **4.1.3 Route 17 – Tide Head to Saint Léonard** **44**
  - **4.1.4 Cost of Improvements to Existing Highway Alignment** **50**
- **4.2 Potential for New Highway Alignments** **52**
  - **4.2.1 Segment 11-3, Tracadie-Sheila Area** **52**
  - **4.2.2 Segment 11-5, Blanchard Road to Bertrand** **53**
  - **4.2.3 Segment 11-2, Burnt Church to Tracadie-Sheila** **53**
  - **4.2.4 Segment 17-3, Whites Brook to Restigouche County Line.** **53**
- **4.3 Other Improvement Strategies** **54**
- **4.4 Total Cost of Improvements** **54**

APPENDICES **56**

List of Tables

Table 1-1: Range of Traffic Volumes (Arterial Highways) 4
Table 2-1: Evaluation Criteria 6
Table 2-2: Route Segments 7
Table 2-3: Estimated Construction Costs 10
Table 3-1: Collision Rate 12
Table 3-2: Passing Restrictions 15
Table 3-3: Traffic Volumes 18
Table 3-4: Minimum Evaluation Standards 20
Table 3-5: Geometric Deficiencies 21
Table 3-6: Posted Speed 24
Table 3-7: Criteria Weighting 26
Table 3-8: Overall Ranking By Segment 28
Table 3-9: Overall Ranking By Rank 29
Table 4-1: Segment 11-1 Improvement Strategies & Costs, Existing Alignment 33
Table 4-2: Segment 11-2 Improvement Strategies & Costs, Existing Alignment 34
Table 4-3: Segment 11-3 Improvement Strategies & Costs, Existing Alignment and Bypass 35
Table 4-4: Segment 11-4 Improvement Strategies & Costs, Existing Alignment 36
Table 4-5: Segment 11-5 Improvement Strategies & Costs, Existing Alignment 37
Table 4-6: Segment 11-6 Improvement Strategies & Costs, Existing Alignment 38
Table 4-7: Segment 11-7 Improvement Strategies & Costs, Existing Alignment 39
Table 4-8: Segment 11-8 Improvement Strategies & Costs, Existing Alignment 41
Table 4-9: Segment 11-9 Improvement Strategies & Costs, Existing Alignment 42
Table 4-10: Segment 11-10 Improvement Strategies & Costs, Existing Alignment 43

List of Tables (cont'd)

Table 4-11: Segment 17-1 Improvement Strategies & Costs, Existing Alignment and Bypass 45

Table 4-12 Segment 17-2 Improvement Strategies & Costs, Existing Alignment 46

Table 4-13: Segment 17-3 Improvement Strategies & Costs, Existing Alignment 47

Table 4-14: Segment 17-4 Improvement Strategies & Costs, Existing Alignment 48

Table 4-15: Segment 17-5 Improvement Strategies & Costs, Existing Alignment 49

Table 4-16: Remediation Cost Summary 51

Table 4-17: Total Cost of Improvements to Existing Alignment 55

List of Figures

Figure 1-1: Segment Map 2
Figure 3-1: Collision Weighting 11
Figure 3-2: Collision Rate 13
Figure 3-3: Passing Restrictions 16
Figure 3-4: Traffic Volumes 19
Figure 3-5: Geometric Deficiencies 22
Figure 3-6: Posted Speed 25
Figure 3-7: Overall Ranking 30

List of Abbreviations

AADT:	Average Annual Daily Traffic
AADTT:	Average Annual Daily Truck Traffic
GPS:	Global Positioning System
K value:	Vertical Curvature (Horizontal distance along a parabolic curve required to effect a 1% change in gradient)
MVK:	Million Vehicle Kilometer
NNBC:	Northern New Brunswick Coalition
NBDOT:	New Brunswick Department of Transportation
PSDR:	Passing Sight Distance Restrictions
TAC:	Transportation Association of Canada
TTC:	Temporary Traffic Counter

Executive Summary

Industries and businesses of northern New Brunswick advocate their geographical location as the main disadvantage in competing in the provincial and global markets, more precisely, the cost of transportation to import and export goods and services. Major portions of the youth population entering the workforce migrate to the south of the province or even, out of province, to find work. This has had a negative impact in the area and jeopardizes the future of the region.

A group under the name of **Northern New Brunswick Coalition (NNBC)** was formed in 2002 to represent public, business, industrial, and organizational interests in the region. As stated in a document prepared by the NNBC, the Coalition *"is firmly committed to the activities of mobilization, joint action, and partnership in the sole objective of bringing Route 11 and 17 up to a standard that makes it possible to optimize the competitive position of local businesses and improve the potential for economic development in northern and eastern New Brunswick."*

In response to the efforts being made by the NNBC, the New Brunswick Department of Transportation has mandated the firms of Boissonnault McGraw and Roy Consultants Group to prepare a report for Route 11 and 17 along the entire corridor from Miramichi to Saint-Léonard. The purpose of this report is to assess the conditions within the existing highway corridor, recommend improvement strategies and estimate the costs to implement the identified improvements. The goal is to achieve an upgraded roadway that meets present day standards for an arterial class highway, with a minimum posted speed of 90 km/h in rural areas and 50 km/h in urban areas.

The highway network of northern New Brunswick being studied has been divided into 15 evaluation segments of varying lengths (see Figure 1-1) and grouped into three (3) main sections each having their own historical, physical, and present day use characteristics.

- Route 11, from Miramichi to Bathurst serving the Acadian Peninsula;
- Route 11, from Bathurst to Tide Head being the main link between the Chaleur and Restigouche regions and the Quebec border;
- Route 17, from Tide Head to Saint-Léonard being the east-west connection with the Trans-Canada Highway (Route 2).

Executive Summary (cont'd)

For the purpose of identifying the areas of concern along the study corridor, five (5) evaluation criteria were used in the analysis of each segment. The five evaluation criteria are Safety, Service, Economic, Geometry, and Travel Time. In order to summarize the findings, an overall assessment of each criterion was performed. A weighted formula was then used to establish the relative priority of each highway segment. The results of the criteria analysis are displayed in order of priority in Table 3-9. It is important to note that the overall rank of each of the fifteen (15) segments only determines the relative priority of each complete segment as compared to the other segments in their entirety. It is not intended to be used as the sole or primary tool in developing an overall highway improvement plan for the highway network under study as there are different improvement strategies required, even within each highway segment.

The actual capital improvement plan for any given budget year will be based upon a wide variety of factors such as specific needs within segments, land availability, route planning and design requirements, structure and bridge replacement scheduling, continuity with adjacent segment improvements, environmental approvals, and available funding.

The overall cost to upgrade Route 11 and 17 within the study corridor including potential bypasses is estimated to be in the range of $195 to $265 million.

The costs involved to remediate the existing corridor alone are in the vicinity of $144 million. A listing of the costs per segment can be found in Table 4-16.

There are also a number of areas where roadside development is the controlling factor for posted speed. In these cases, upgrading highway segments based on the geometric parameters to meet the RAU 90 standards will not achieve a posted speed of 90 km/h. Bypassing these areas may be the only method of achieving the desired posted speed. Locations identified for possible bypasses are described in sections 4.2.1 through 4.2.4 in the report. The costs involved to bypass the areas identified in the report are estimated between $50 to $120 million. These areas will require further study.

Other strategies that could improve the safety and streamline traffic flow have also been identified in section 4.3 but not fully investigated in this report.

1.0 INTRODUCTION

1.1 Background

This report has been prepared as a team effort by the firms of Boissonnault McGraw and Roy Consultants Group for the New Brunswick Department of Transportation (NBDOT). The geographical area identified in this study is the northern region of New Brunswick from Miramichi to Saint-Léonard. The specific highways are Route 11 from the Centennial Bridge in Miramichi to the junction with Route 17 in Tide Head and Route 17 from Tide Head to Saint-Léonard.

In recent years, the residents of northern New Brunswick have been concerned with the reduction in population of their area. Major portions of the youth population entering the workforce migrate to the south of the province or even, out of province, to find work. This has had a negative impact in the area and jeopardizes the future of the region. Northern New-Brunswickers realize that the economy of the region must be addressed.

Industries and businesses of the region advocate their geographical location as the main disadvantage, more precisely, the cost of transportation to import and export goods and services. A group under the name of **Northern New Brunswick Coalition (NNBC)** was formed in 2002 to represent public, business, industrial, and organizational interests in the region. As stated in a document prepared by the NNBC, the Coalition *"is firmly committed to the activities of mobilization, joint action, and partnership in the sole objective of bringing Route 11 and 17 up to a standard that makes it possible to optimize the competitive position of local businesses and improve the potential for economic development in northern and eastern New Brunswick."* In order to have a complete assessment of the northern New Brunswick highways (Route 11 and Route 17) and to address the NNBC's concerns, NBDOT has mandated a report for the entire corridor from Miramichi to Saint-Léonard.

As seen in Figure 1-1, the highway network of northern New Brunswick being studied has been split into 15 evaluation segments. The segments have then been regrouped into three main sections. Each section has its own historical, physical, and present day use characteristics.

- Route 11, from Miramichi to Bathurst serving the Acadian Peninsula;
- Route 11, from Bathurst to Tide Head being the main link between the Chaleur and Restigouche regions and the Quebec border;
- Route 17, from Tide Head to Saint-Léonard being the east-west connection with the Trans Canada Highway (Route 2).

Figure 1-1: **Segment Map**

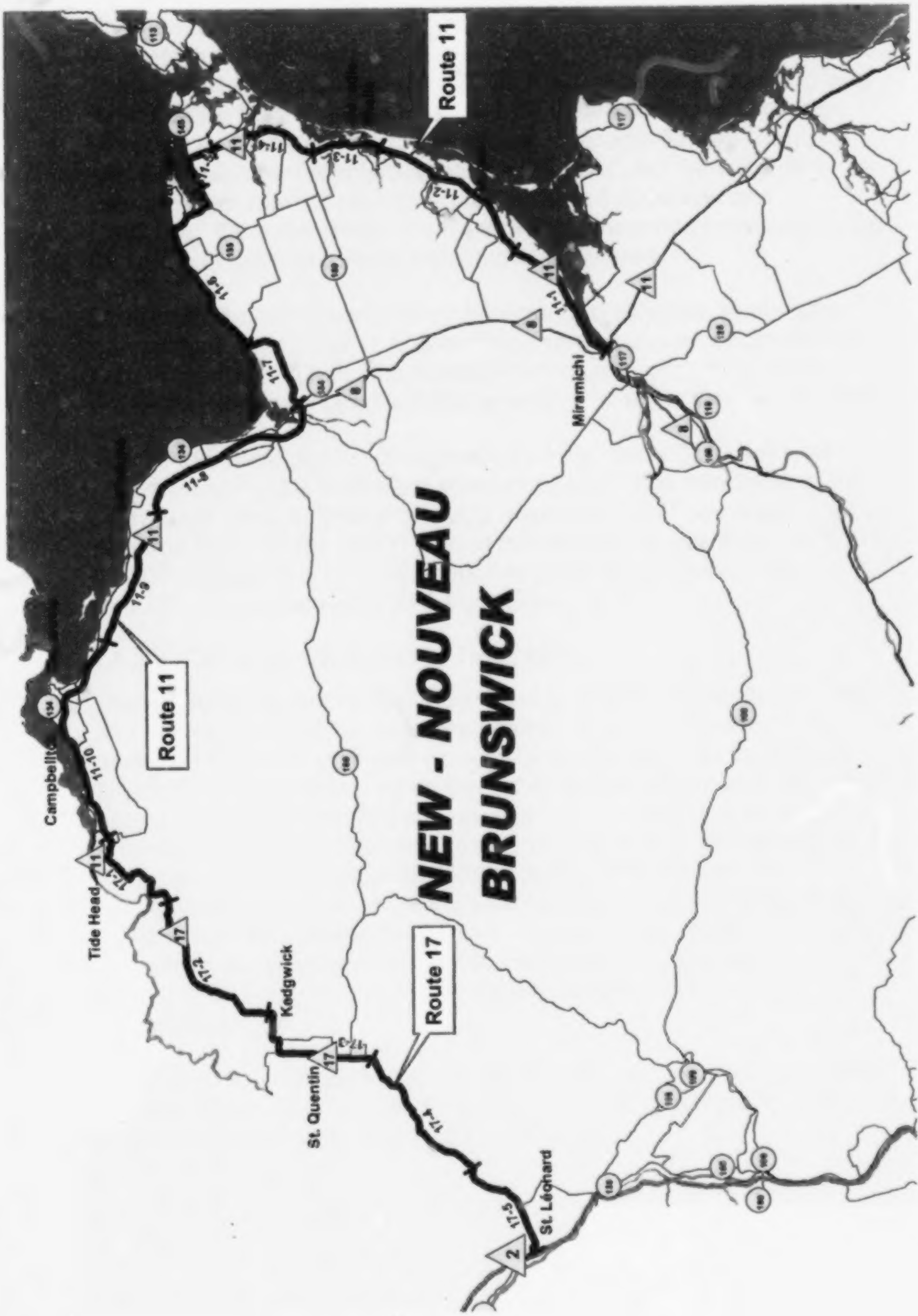
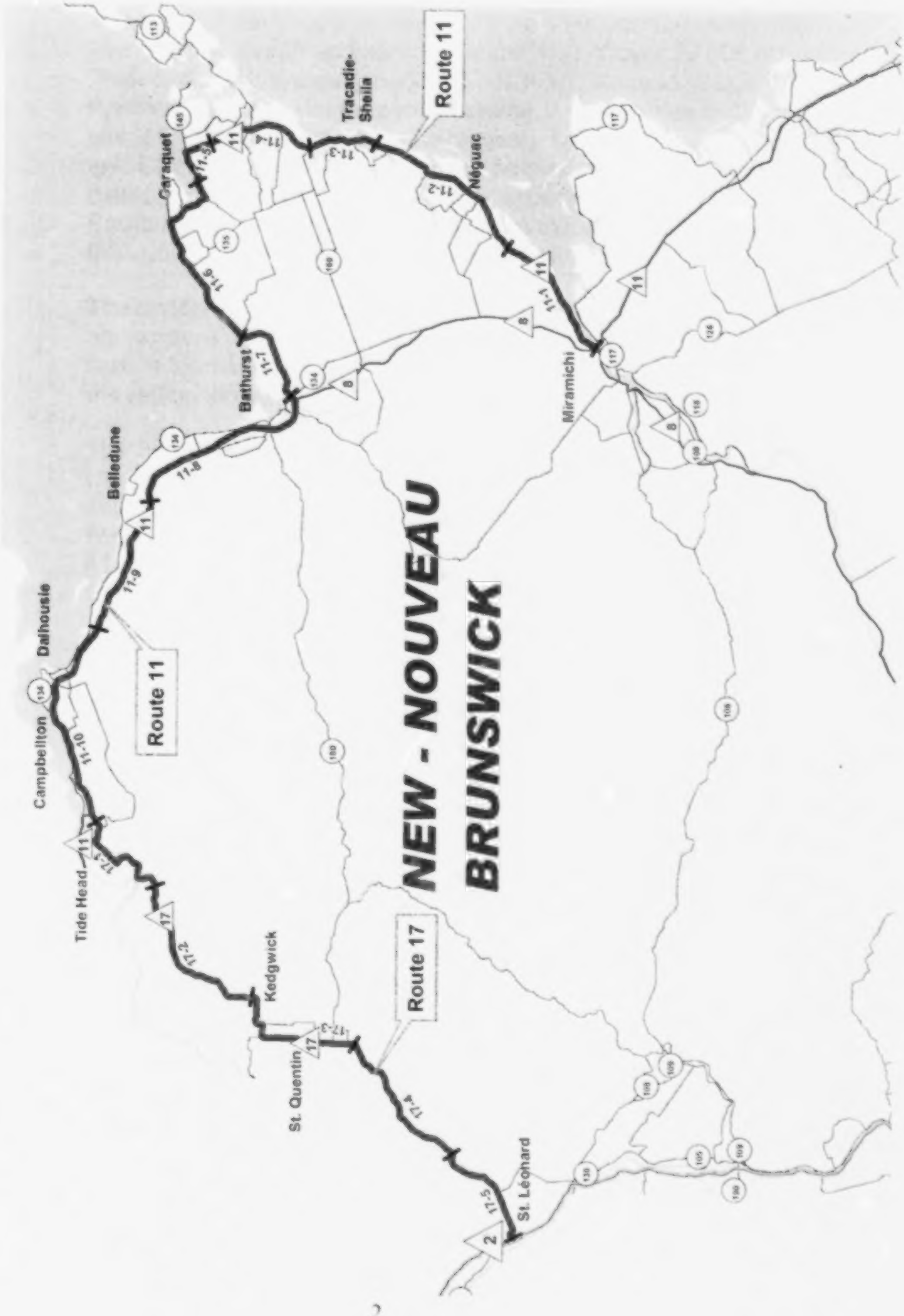

Route 11
Route 11
Route 17
NEW - NOUVEAU
BRUNSWICK
Miramichi
Campbellton
Tide Head
Kedgwick
St. Quentin
St. Léonard
11-1
11-2
11-3
11-4
11-5
11-6
11-7
11-8
11-9
11-10
17-1
17-2
17-3
17-4
17-5
11
17
8
2

Figure 1-1: Segment Map


Route 11
Tracadie-Sheila
Caraquet
Néguac
Miramichi
Bathurst
Belledune
Dalhousie
Campbellton
Tide Head
Kedgwick
St. Quentin
St. Léonard
Route 11
Route 17
NEW - NOUVEAU
BRUNSWICK
11-1
11-2
11-3
11-4
11-5
11-6
11-7
11-8
11-9
11-10
17-1
17-2
17-3
17-4
17-5
11
8
17
2
117
126
134
135
145
160
180
108
113

1.1.1 Route 11 - Acadian Peninsula

The Acadian Peninsula section of Route 11 is approximately 180 kilometers in length and serves a population of over 50 000 residents. This road has historically been the link from village to village following the coastline from Bathurst to Miramichi. It also serves as the main street for municipalities such as Neguac, Tracadie-Sheila, Caraquet and Grande-Anse. Many local service districts also have Route 11 as their principal road. Some examples include Tabusintac and Brantville. Over the years, roadside development has increased along this route to the point where traffic flow is impeded.

The major economic sectors in this region are fisheries, peat moss, aquaculture and forestry. Another important economic sector to this area is tourism. With its rich Acadian culture and pride in its history, the region attracts a large volume of visitors over the summer months.

The 20-kilometre portion of Highway 11 from Janeville to Bathurst (segment 11-7) is a controlled access corridor. The remainder of the segment is open to further roadside development. The Annual Average Daily Traffic (AADT) along this section ranges from 1 670 to 11 500 vehicles/day with an Annual Average Daily Truck Traffic (AADTT) of approximately 290 trucks/day.

1.1.2 Route 11 - Bathurst to Tide Head

The section from Bathurst to Tide Head is nearly 115 kilometers long and serves a population of approximately 55 000 residents. This portion of Route 11 was built from 1970 to 1983 in order to alleviate the traffic and safety issues on the old coastal road (Route 134). This newer section is controlled access and has a posted speed of 100 kilometers per hour. Interchanges have been built to give access to the different municipalities along the route segment. Since its construction, this segment of highway has been considered an asset to the local communities, permitting efficient transportation of goods and services. The volume of traffic presently using this corridor ranges from 2 620 to 7 750 vehicles/day with an AADTT of 570 trucks/day.

The industries of the area include exploitation of mineral resources as well as forestry, tourism and fisheries. The Port of Belledune is also an important economic factor of the region.

1.1.3 Route 17 - Tide Head to Saint-Léonard

Route 17, connecting the northeast and northwest of the province, is approximately 150 kilometers in length. This portion of roadway has a similar history to the Acadian Peninsula section and links the municipalities of Kedgwick and Saint-Quentin to the remainder of the provincial road network. Additional roadside development has occurred over the years in areas such as Saint-Jean-Baptiste and Robinsonville. There are no controlled access sections along Route 17. This east/west corridor is very much influenced by the topography. The mountainous terrain of the area causes Route 17 to have pronounced geometrical features. The population in the area is approximately 20 000 residents. The traffic volume ranges from 1 210 to 3 190 vehicles/day with an AADTT of 330 trucks/day.

The principal industries along Route 17 are forestry and tourism. Forest industries in the area make use of this route to carry goods to and from their locations.

1.1.4 Provincial Traffic Volumes

The NBDOT currently has 39 permanent traffic counters, with 30 of them located along the arterial highway network. These counters currently indicate an AADT range from a low of 1 090 to a high of 32 000 vehicles/day, with a range in truck traffic volume from 240 to 2 500 trucks/day. Table 1-1 shows the range of traffic volumes for provincial arterial highways and the values for each of the three study segment groups.

Table 1-1: Range of Traffic Volumes (Arterial Highways)

	Provincial Arterial Highways	Route 11 Acadian Peninsula	Route 11 Bathurst to Tide Head	Route 17 Tide Head to Saint-Leonard
AADT high	**32 000**	**11 500**	**7 750**	**3 190**
AADT low	**1 090**	**1 670**	**2 620**	**1 210**
AADTT (Truck/day)	**240 -2 500**	**290**	**570**	**330**

1.2 Project Purpose

The purpose of this project is to review the conditions within the existing highway corridor, recommend improvement strategies and estimate the costs to implement the identified improvements. The goal is to achieve an upgraded roadway that meets present day standards for an arterial class highway, with a minimum posted speed of 90 km/h in rural areas and 50 km/h in urban areas.

1.3 Scope of Analysis

The highway corridor under study covers 445 kilometers. Route 11, between Miramichi to Tide Head, is included along with the segments of Route 17, from Tide Head and Saint-Léonard. The sections of Route 11, south of the Miramichi Bridge, as well as the section between Tide Head and the Matapedia Bridge, have not been included. As in the case of other arterial routes elsewhere in the province, there are other highways connecting to Route 11 and Route 17 that influence the traffic flow within the region as well. These highways include Route 8, Route 113, Route 135, Route 160, and Route 180, to name a few. Although these highways also play a role in the overall regional highway network, this report is primarily focused on the identified corridor, Route 11 and Route 17 between Miramichi and Saint-Léonard.

The major portion of the data used in this report has been provided by NBDOT in the form of historical data, design data, field data, and videotapes. In rural areas, the evaluation was done assuming a design speed of 90 km/h with a posted speed of 90 km/h. Where upgrading was required, a design speed of 100 km/h was used in making recommendations. In urban areas, the evaluation was done using a design and posted speed of 50 km/h.

The study uses only present day values in the analysis of criteria and costing of improvements. In addition to identifying segments of the existing highway network that require upgrading to correct current geometric deficiencies, the New Brunswick Department of Transportation's pavement management system and bridge rehabilitation program were accessed to identify pavement and bridge surfaces and structures requiring rehabilitation or replacement over the next five (5) years.

Highway segments identified as being deficient, but not capable of being adequately addressed by upgrading within the existing highway corridor, were considered for replacement with future new highway alignments or bypasses.

A copy of the Terms of Reference for Route 11 and Route 17 Needs Study is included in Appendix "A".

2.0 STUDY APPROACH

2.1 Route Segmentation

For the purpose of this study, Route 11 and Route 17 have been divided into 15 segments of varying lengths. These segments are made up of pre-defined control sections that NBDOT uses for linear referencing of all roads throughout the province. Route 11 has been divided into 10 segments, whereas Route 17 has 5 segments identified. The naming format of these segments is 11-1 through 11-10, and 17-1 through 17-5. Table 2-2, on the following page, presents the list of segment names along with their limit descriptions and lengths.

2.2 Evaluation Criteria

For the purpose of identifying the areas of concern along the study corridor, five (5) evaluation criteria, with their associated parameters, were provided from the NBDOT Terms of Reference. These criteria are itemized in Table 2-1 and have been used in the analysis of each segment.

Table 2-1: Evaluation Criteria

CRITERIA	PARAMETER
Safety	Collision Rates
Service	Passing Restrictions
Economic	Traffic Volumes
Geometry	Surface and Shoulder Width / Horizontal and Vertical Alignments
Travel Time	Posted Speed

Highway strength was also not considered as a separate evaluation criteria, as Routes 11 and 17 have no spring weight restrictions. However, it is recognized that some of the connections to these highways are subject to spring weight restrictions.

2.0 STUDY APPROACH

2.1 Route Segmentation

For the purpose of this study, Route 11 and Route 17 have been divided into 15 segments of varying lengths. These segments are made up of pre-defined control sections that NBDOT uses for linear referencing of all roads throughout the province. Route 11 has been divided into 10 segments, whereas Route 17 has 5 segments identified. The naming format of these segments is 11-1 through 11-10, and 17-1 through 17-5. Table 2-2, on the following page, presents the list of segment names along with their limit descriptions and lengths.

2.2 Evaluation Criteria

For the purpose of identifying the areas of concern along the study corridor, five (5) evaluation criteria, with their associated parameters, were provided from the NBDOT Terms of Reference. These criteria are itemized in Table 2-1 and have been used in the analysis of each segment.

Table 2-1: Evaluation Criteria

CRITERIA	PARAMETER
Safety	Collision Rates
Service	Passing Restrictions
Economic	Traffic Volumes
Geometry	Surface and Shoulder Width / Horizontal and Vertical Alignments
Travel Time	Posted Speed

Highway strength was also not considered as a separate evaluation criteria, as Routes 11 and 17 have no spring weight restrictions. However, it is recognized that some of the connections to these highways are subject to spring weight restrictions.

Table 2-2
ROUTE SEGMENTS

ROUTE 11 AND ROUTE 17 NEEDS STUDY			
Number	**Description**	**Total Length (km)**	**Access Control**
11-1	Miramichi to Burnt Church	31.17	Non-Controlled Access
11-2	Burnt Church to Tracadie-Sheila	34.61	Non-Controlled Access
11-3	Tracadie-Sheila area (County Line to Route 160)	14.87	Non-Controlled Access
11-4	Route 160 to Blanchard Road	20.88	Non-Controlled Access
11-5	Blanchard Road to Bertrand	16.29	Non-Controlled Access
11-6	Bertrand to Janeville	40.73	Non-Controlled Access
11-7	Janeville to Bathurst	19.87	Controlled Access (level 2)
11-8	Bathurst to Belledune	41.14	Controlled Access (level 2)
11-9	Belledune to Charlo	31.69	Controlled Access (level 1)
11-10	Charlo to Tide Head	44.33	Controlled Access (level 2)
17-1	Tide Head to Robinsonville	21.03	Non-Controlled Access
17-2	Robinsonville to Whites Brook	38.21	Non-Controlled Access
17-3	Whites Brook to Restigouche County Line	31.27	Non-Controlled Access
17-4	Restigouche / Victoria County Line to Victoria / Madawaska County Line	32.66	Non-Controlled Access
17-5	Victoria / Madawaska County Line to Saint-Léonard	24.69	Non-Controlled Access

2.3 Data Collection

NBDOT Planning and Land Management Branch has provided a major portion of the data required to evaluate the segments. In addition to digital and hardcopy data, videotapes recorded in 2002 of the full corridor were made available. To obtain an accurate account of the existing horizontal and vertical geometry, NBDOT has used Global Positioning System (GPS) technology to collect readings at 20m intervals along the entire corridor centerline. Field measurements were also performed to confirm pavement and shoulder widths.

Other inputs from concerned parties, such as the NNBC and the different district regional offices of NBDOT, were gathered.

2.4 Data Analysis

The data used in this report has been sorted to correlate with each segment of highway. All data rendered obsolete by improvements or new construction, were excluded from the study.

The goal of the analysis is to obtain an average of each criterion parameter for all segments. The segments have varying lengths. Therefore, the weighted average of each evaluation parameter has been calculated.

There has been no distinction made between rural and urban regions when applying the parameters except when evaluating for geometry. Different geometrical standards are used for rural and urban regions. Rural areas are defined as being outside municipal boundaries and include local service districts. Urban areas are defined as being inside municipality boundaries,

2.5 Prioritization

In order to compare the segments, a ranking order has been established where 1 is the most deficient and 15 is the least deficient. This ranking system has been used for each criterion parameter. A weighted formula was applied, using all criteria to generate an overall ranking.

2.6 Upgrading Strategies

Although each criterion plays a role in the overall ranking, remediation has primarily been based on the geometric deficiencies. The collision rates, passing restrictions, and travel time (mostly in rural areas) will be positively affected by improving the geometric parameters. Upgrading strategies have been identified on a segment-by-segment basis showing the location and the level of geometric deficiency.

As previously mentioned within the Scope of Analysis, the department's pavement management system and bridge rehabilitation program were also accessed to identify pavement and bridge surfaces and structures requiring rehabilitation or replacement over the next five (5) year period.

If a highway segment was identified as being deficient and not capable of having the deficiencies addressed by upgrading within the existing alignment, the area was considered for replacement with a new highway alignment or future highway bypass. Other upgrading strategies have also been identified such as intersection improvements, and acceleration and deceleration lane lengthening at interchanges.

2.7 Cost Determination

Each improvement or remediation measure has been assigned a dollar value using order-of-magnitude cost estimates as shown in Table 2-3. These estimates are based on recent projects of similar nature.

The horizontal and vertical alignment cost estimates already address the shoulder and surface width components. Therefore, in areas where deficient geometric components overlap, only the alignment cost is used to determine the existing highway improvement costs.

The costs for upgrading pavement surfaces and bridge rehabilitation / replacement identified from the department's pavement management system and bridge rehabilitation program were estimated directly from the two respective programs. It was only possible to estimate a range of costs for potential new highway alignments at this stage as they will require further study.

Table 2-3: Estimated Construction Costs

GEOMETRY COMPONENT	DESCRIPTION	COST ($ / KM)
Surface Width	Milling, Seal, and slug to required width	200 000
Shoulder Width	Shoulder and re-ditching (unpaved shoulder)	75 000
Horizontal Alignment (major)	Major re-alignment with complete roadway structure (ROW acquisition)	1 500 000
Horizontal Alignment (minor)	Minor re-alignment (salvage part of existing roadway structure)	750 000
Vertical Alignment	Complete Roadway Structure	1 350 000
Addition Lane	Additional 3.7m climbing or passing lane with re-ditching	350 000

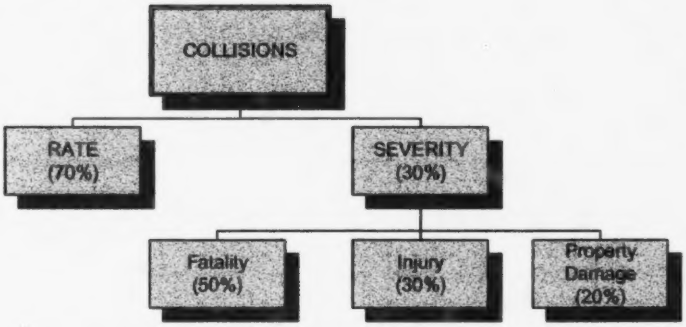
3.0 NETWORK ANALYSIS

In keeping with the terms of reference, the evaluation results were tabulated, ranked, and mapped throughout the report. This was done in order that the reader may see the varying levels of deficiencies along the study corridor for each of the five evaluation criteria: Safety, Service, Economic, Geometry, and Travel Time.

3.1 Collision Rate (safety indicator)

As a measure of safety along the study corridor, collision rates are a good indicator of problem areas. The collision rate values reflect the average number of collisions per million vehicle kilometers (MVK) over a maximum 15-year period. The 15-year collision data provided in the study extends from 1986 to 2001, inclusively. The severity of the collision was also analyzed and factored into the final results. The three categories of collision severity are depicted in Figure 3-1.

Figure 3-1: Collision Weighting



Of the overall collision ranking, 70% was applied to the collision rate and 30% to severity. Collisions occurring due to wildlife interference do not necessarily reflect a deficiency in the condition of the roadway network. However, these collisions still get recorded.

As seen in Table 3-1, collision rates range from a low of 0.41 collisions/MVK in segment 11-7, Janeville to Bathurst, to a high of 2.81 collisions/MVK in segment 11-3, Tracadie-Sheila area. This is also displayed geographically in Figure 3-2. The raw data used for this parameter shows that in the case of the Tracadie-Sheila segment, the major portion of collisions have occurred within municipal limits. This study does not differentiate between rural and urban boundaries when analyzing collision rates, but calculates a rate throughout the entire evaluation segment.

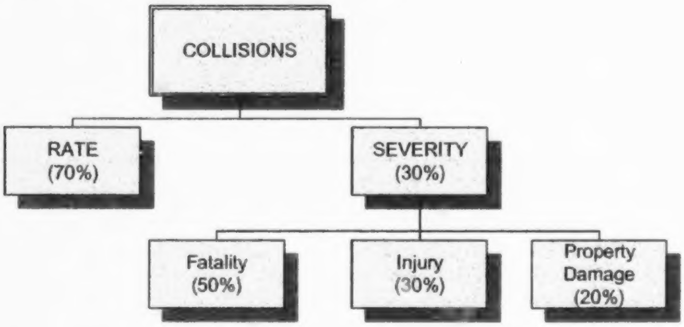
3.0 NETWORK ANALYSIS

In keeping with the terms of reference, the evaluation results were tabulated, ranked, and mapped throughout the report. This was done in order that the reader may see the varying levels of deficiencies along the study corridor for each of the five evaluation criteria: Safety, Service, Economic, Geometry, and Travel Time.

3.1 Collision Rate (safety indicator)

As a measure of safety along the study corridor, collision rates are a good indicator of problem areas. The collision rate values reflect the average number of collisions per million vehicle kilometers (MVK) over a maximum 15-year period. The 15-year collision data provided in the study extends from 1986 to 2001, inclusively. The severity of the collision was also analyzed and factored into the final results. The three categories of collision severity are depicted in Figure 3-1.

Figure 3-1: Collision Weighting



Of the overall collision ranking, 70% was applied to the collision rate and 30% to severity. Collisions occurring due to wildlife interference do not necessarily reflect a deficiency in the condition of the roadway network. However, these collisions still get recorded.

As seen in Table 3-1, collision rates range from a low of 0.41 collisions/MVK in segment 11-7, Janeville to Bathurst, to a high of 2.81 collisions/MVK in segment 11-3, Tracadie-Sheila area. This is also displayed geographically in Figure 3-2. The raw data used for this parameter shows that in the case of the Tracadie-Sheila segment, the major portion of collisions have occurred within municipal limits. This study does not differentiate between rural and urban boundaries when analyzing collision rates, but calculates a rate throughout the entire evaluation segment.

Table 3-1
Collision Rate

ROUTE 11 AND ROUTE 17 NEEDS STUDY							
Segment			Collision Rate				
Number	Description	Total Length (km)	15 Year Weighted Average Collision Rate (70%)	15 Year Average Collisions by Severity (30%)			Ranking
			Collisions per Million Vehicle Kilometer	Property Damages (20%)	Injuries (30%)	Fatalities (50%)	
11-1	Miramichi to Burnt Church	31.17	0.92	44.1	19.1	0.7	**9**
11-2	Burnt Church to Tracadie-Sheila	34.61	1.91	89.7	41.7	0.7	**4**
11-3	Tracadie-Sheila area (County Line to Route 160)	14.87	2.81	166.9	76.1	0.3	**1**
11-4	Route 160 to Blanchard Road	20.88	1.73	72.1	36.8	1.3	**5**
11-5	Blanchard Road to Bertrand	16.29	2.49	106.0	46.5	0.5	**2**
11-6	Bertrand to Janeville	40.73	1.22	54.4	24.0	0.6	**6**
11-7	Janeville to Bathurst	19.87	0.41	10.1	4.1	0.4	**15**
11-8	Bathurst to Belledune	41.14	0.50	45.1	17.1	1.9	**11**
11-9	Belledune to Charlo	31.69	0.45	18.7	8.6	0.6	**14**
11-10	Charlo to Tide Head	44.33	0.49	33.2	15.5	0.9	**12**
17-1	Tide Head to Robinsonville	21.03	0.90	20.6	7.2	0.0	**13**
17-2	Robinsonville to Whites Brook	38.21	1.23	26.8	12.2	0.4	**7**
17-3	Whites Brook to Restigouche County Line	31.27	2.15	85.6	33.2	1.2	**3**
17-4	Restigouche / Victoria County Line to Victoria / Madawaska County Line	32.66	0.99	26.0	9.2	0.6	**10**
17-5	Victoria / Madawaska County Line to Saint-Léonard	24.69	1.12	34.8	11.2	1.0	**8**

Note: Ranking indicates segment of worst (Rank 1) to best condition (Rank 15).

Table 3-1
Collision Rate

ROUTE 11 AND ROUTE 17 NEEDS STUDY							
Segment			Collision Rate				
Number	Description	Total Length (km)	15 Year Weighted Average Collision Rate (70%)	15 Year Average Collisions by Severity (30%)			Ranking
			Collisions per Million Vehicle Kilometer	Property Damages (20%)	Injuries (30%)	Fatalities (50%)	
11-1	Miramichi to Burnt Church	31.17	0.92	44.1	19.1	0.7	**9**
11-2	Burnt Church to Tracadie-Sheila	34.61	1.91	89.7	41.7	0.7	**4**
11-3	Tracadie-Sheila area (County Line to Route 160)	14.87	2.81	166.9	76.1	0.3	**1**
11-4	Route 160 to Blanchard Road	20.88	1.73	72.1	36.8	1.3	**5**
11-5	Blanchard Road to Bertrand	16.29	2.49	106.0	46.5	0.5	**2**
11-6	Bertrand to Janeville	40.73	1.22	54.4	24.0	0.6	**6**
11-7	Janeville to Bathurst	19.87	0.41	10.1	4.1	0.4	**15**
11-8	Bathurst to Belledune	41.14	0.50	45.1	17.1	1.9	**11**
11-9	Belledune to Charlo	31.69	0.45	18.7	8.6	0.6	**14**
11-10	Charlo to Tide Head	44.33	0.49	33.2	15.5	0.9	**12**
17-1	Tide Head to Robinsonville	21.03	0.90	20.6	7.2	0.0	**13**
17-2	Robinsonville to Whites Brook	38.21	1.23	26.8	12.2	0.4	**7**
17-3	Whites Brook to Restigouche County Line	31.27	2.15	85.6	33.2	1.2	**3**
17-4	Restigouche / Victoria County Line to Victoria / Madawaska County Line	32.66	0.99	26.0	9.2	0.6	**10**
17-5	Victoria / Madawaska County Line to Saint-Léonard	24.69	1.12	34.8	11.2	1.0	**8**

Note: Ranking indicates segment of worst (Rank 1) to best condition (Rank 15).

Figure 3-2: Collision Rate

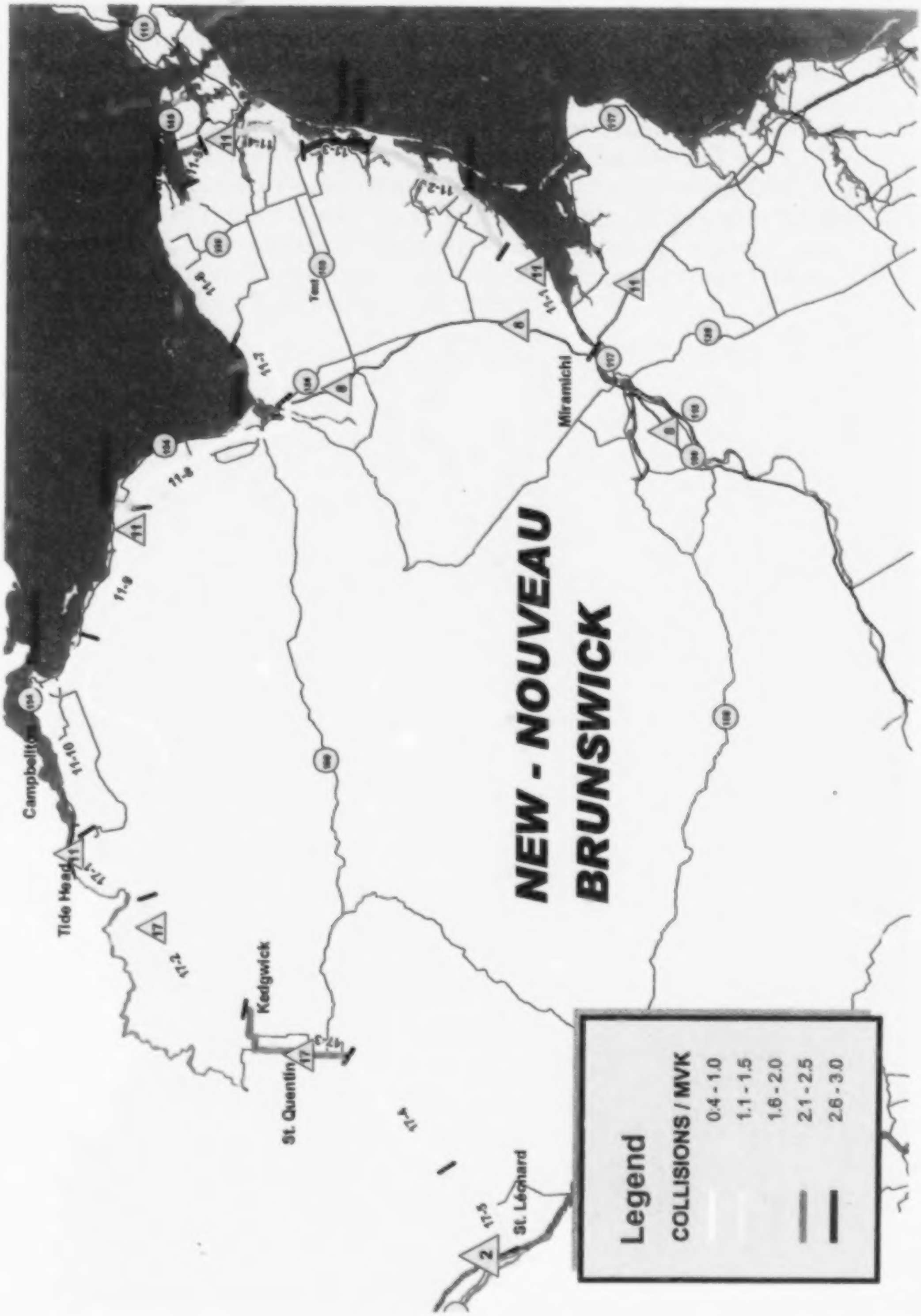
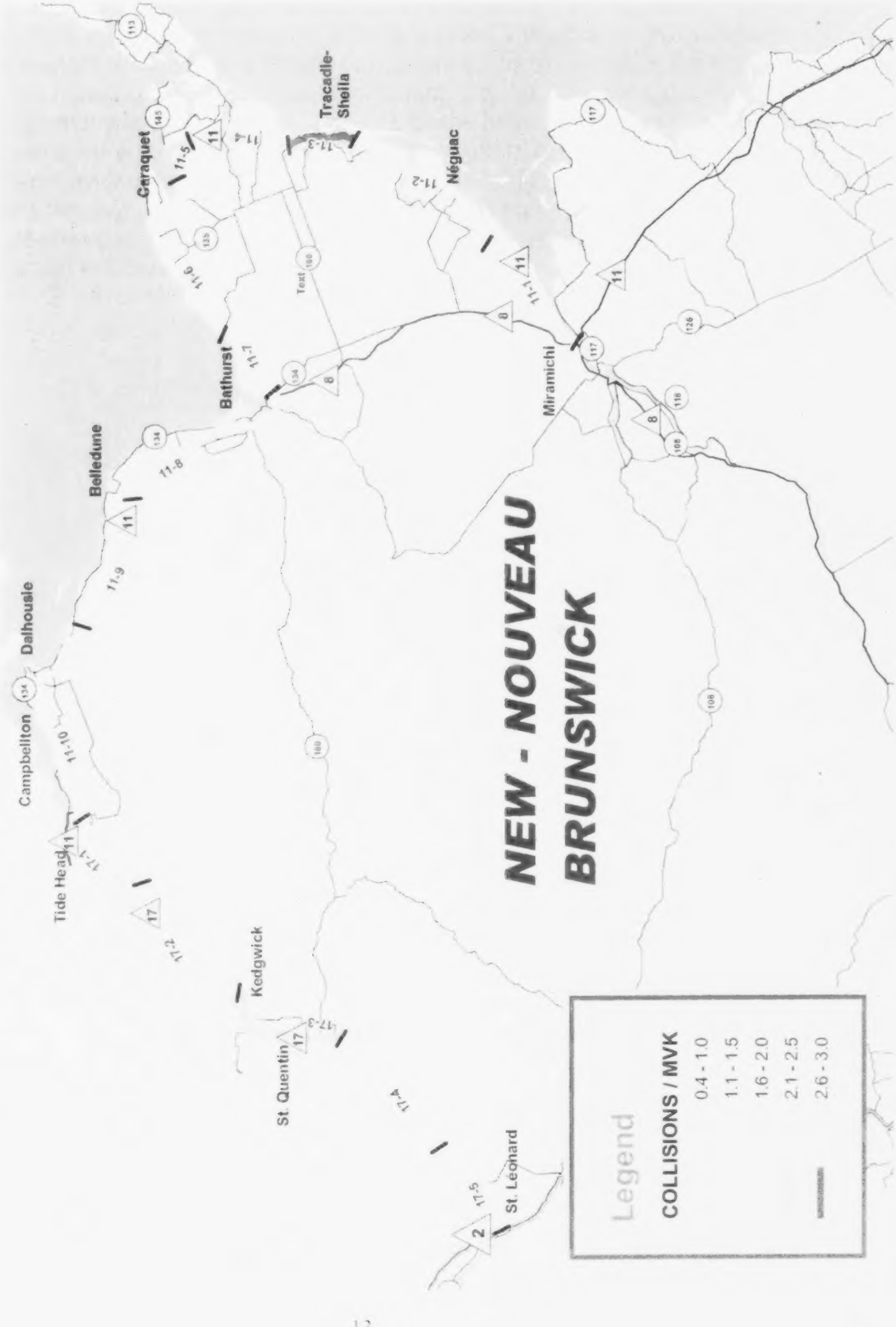

NEW - NOUVEAU BRUNSWICK
Campbellton
Tide Head
Kedgwick
St. Quentin
St. Léonard
Miramichi
Tracadie
11-1
11-2
11-3
11-4
11-5
11-6
11-7
11-8
11-9
11-10
17-1
17-2
17-3
17-4
17-5
11
8
17
2
Legend
COLLISIONS / MVK
0.4 - 1.0
1.1 - 1.5
1.6 - 2.0
2.1 - 2.5
2.6 - 3.0

Figure 3-2: Collision Rate


NEW - NOUVEAU BRUNSWICK
Legend
COLLISIONS / MVK
0.4 - 1.0
1.1 - 1.5
1.6 - 2.0
2.1 - 2.5
2.6 - 3.0
Campbellton
Dalhousie
Belledune
Bathurst
Caraquet
Tracadie-Sheila
Néguac
Miramichi
Tide Head
Kedgwick
St. Quentin
St. Léonard
11-1
11-2
11-3
11-4
11-5
11-6
11-7
11-8
11-9
11-10
17-1
17-2
17-3
17-4
17-5
11
17
8
2
113
145
135
160
134
117
126
118
108
180
Text

3.2 Passing Restrictions (service indicator)

The service criterion in this study is limited to the passing restrictions for motorists. Passing restrictions have a direct influence on the congestion, travel time and level of comfort experienced by the users of the highway. The Passing Sight Distance Restrictions (PSDR) has been derived from logs maintained by NBDOT. PSDR for the initial and return directions were averaged and weighted for the overall length of the segment. The 15 highway segments have been ranked according to the average PSDR and are displayed in Table 3-2 and Figure 3-3. Segments containing extended urban areas such as Caraquet (segment 11-5) and through mountainous terrain such as from Saint-Quentin to Saint-Léonard (segments 17-4 and 17-5), have relatively high passing restrictions.

Table 3-2
Passing Restrictions

ROUTE 11 AND ROUTE 17 NEEDS STUDY				
Segment			Passing Restrictions	
Number	Description	Total Length (km)	Weighted Average Passing Sight Distance Restrictions (PSDR)	Ranking
11-1	Miramichi to Burnt Church	31.17	32.70	15
11-2	Burnt Church to Tracadie-Sheila	34.61	33.99	14
11-3	Tracadie-Sheila area (County Line to Route 160)	14.87	61.39	6
11-4	Route 160 to Blanchard Road	20.88	49.21	11
11-5	Blanchard Road to Bertrand	16.29	70.77	4
11-6	Bertrand to Janeville	40.73	53.06	10
11-7	Janeville to Bathurst	19.87	37.19	13
11-8	Bathurst to Belledune	41.14	59.46	7
11-9	Belledune to Charlo	31.69	46.48	12
11-10	Charlo to Tide Head	44.33	56.49	8
17-1	Tide Head to Robinsonville	21.03	72.66	2
17-2	Robinsonville to Whites Brook	38.21	67.34	5
17-3	Whites Brook to Restigouche County Line	31.27	55.99	9
17-4	Restigouche / Victoria County Line to Victoria / Madawaska County Line	32.66	72.04	3
17-5	Victoria / Madawaska County Line to Saint-Léonard	24.69	72.92	1

Note: Ranking indicates segment of worst (Rank 1) to best condition (Rank 15).

Table 3-2
Passing Restrictions

ROUTE 11 AND ROUTE 17 NEEDS STUDY				
Segment			Passing Restrictions	
Number	Description	Total Length (km)	Weighted Average Passing Sight Distance Restrictions (PSDR)	Ranking
11-1	Miramichi to Burnt Church	31.17	32.70	15
11-2	Burnt Church to Tracadie-Sheila	34.61	33.99	14
11-3	Tracadie-Sheila area (County Line to Route 160)	14.87	61.39	6
11-4	Route 160 to Blanchard Road	20.88	49.21	11
11-5	Blanchard Road to Bertrand	16.29	70.77	4
11-6	Bertrand to Janeville	40.73	53.06	10
11-7	Janeville to Bathurst	19.87	37.19	13
11-8	Bathurst to Belledune	41.14	59.46	7
11-9	Belledune to Charlo	31.69	46.48	12
11-10	Charlo to Tide Head	44.33	56.49	8
17-1	Tide Head to Robinsonville	21.03	72.66	2
17-2	Robinsonville to Whites Brook	38.21	67.34	5
17-3	Whites Brook to Restigouche County Line	31.27	55.99	9
17-4	Restigouche / Victoria County Line to Victoria / Madawaska County Line	32.66	72.04	3
17-5	Victoria / Madawaska County Line to Saint-Léonard	24.69	72.92	1

Note: Ranking indicates segment of worst (Rank 1) to best condition (Rank 15).

Figure 3-3: Passing Restrictions

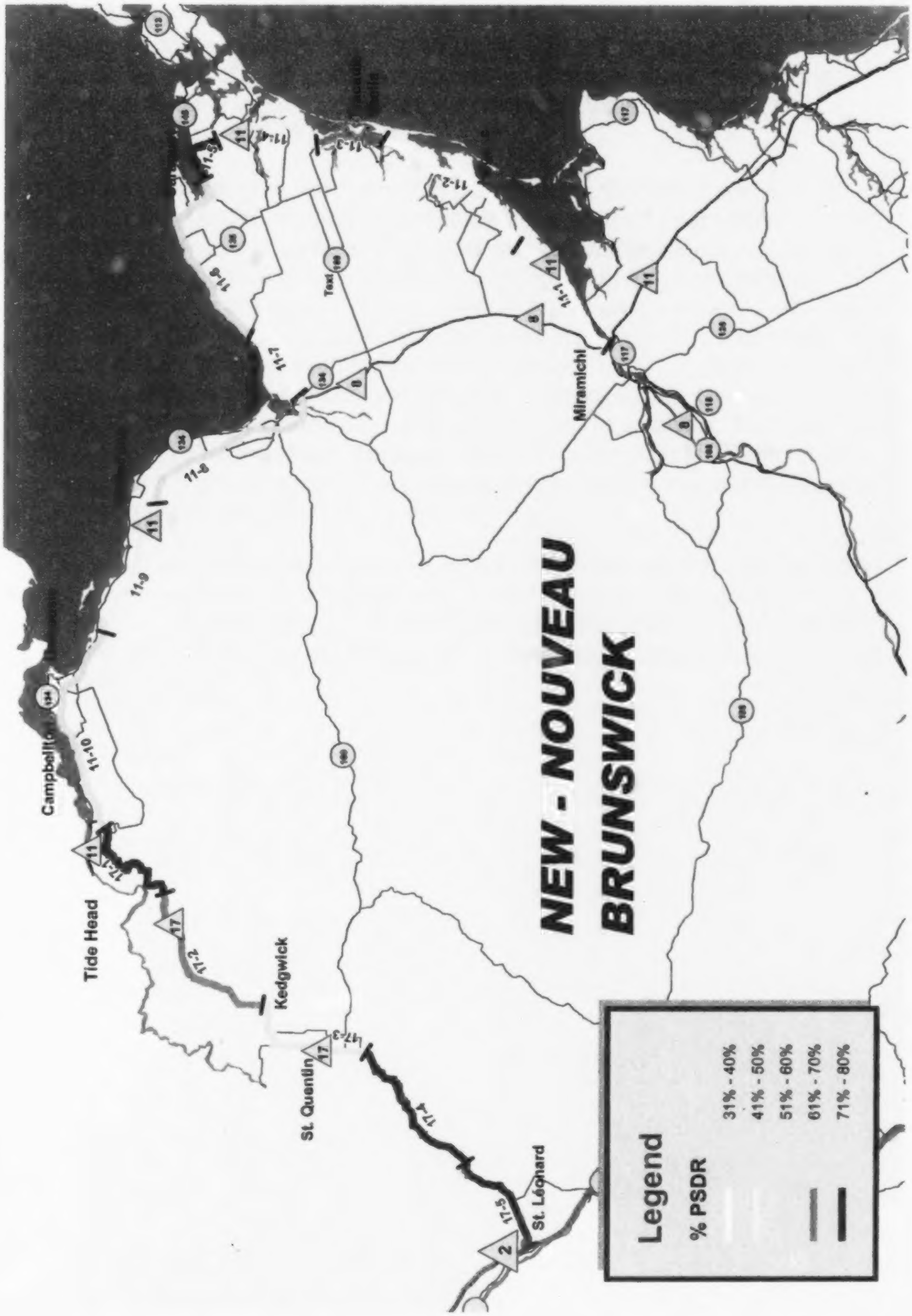
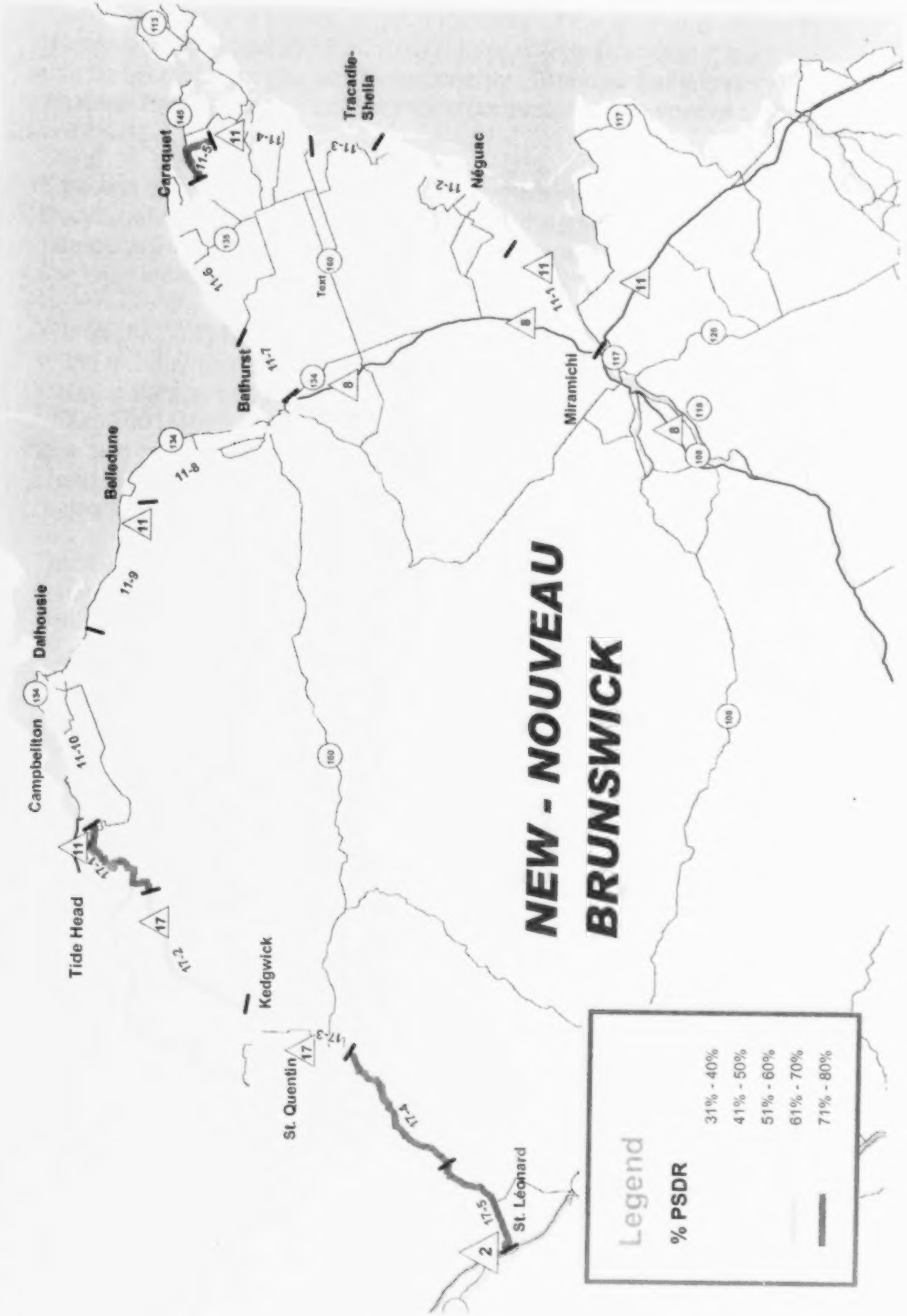

NEW - NOUVEAU BRUNSWICK
Campbellton
Tide Head
Kedgwick
St. Quentin
St. Léonard
Miramichi
11-1
11-2
11-3
11-4
11-5
11-6
11-7
11-8
11-9
11-10
11-11
17-1
17-2
17-3
17-4
17-5
Legend
% PSDR
31% - 40%
41% - 50%
51% - 60%
61% - 70%
71% - 80%

Figure 3-3: Passing Restrictions


NEW - NOUVEAU
BRUNSWICK
Caraquet
Tracadie-Sheila
Néguac
Bathurst
Miramichi
Belledune
Dalhousie
Campbellton
Tide Head
Kedgwick
St. Quentin
St. Léonard
11-1
11-2
11-3
11-4
11-5
11-6
11-7
11-8
11-9
11-10
17-1
17-2
17-3
17-4
17-5
11
8
17
2
113
145
135
160
134
117
126
118
108
180
Legend
% PSDR
31% - 40%
41% - 50%
51% - 60%
61% - 70%
71% - 80%

3.3 Traffic Volumes (economic indicator)

Traffic volumes are usually a good indicator of the economy of a region. Because of the industrial nature of northern New Brunswick, truck traffic can be an indicator of a positive economy. Summer tourists along the Acadian Peninsula also account for a considerable amount of traffic volumes.

The data used for the traffic volume parameter is from Average Annual Daily Traffic (AADT) counts recorded over the past 10 years from Temporary Traffic Counters (TTC) and permanent classifiers located at strategic locations. Truck traffic is only recorded at three permanent locations within the study corridor. Therefore, Average Annual Daily Truck Traffic (AADTT) has not been included in the ranking of the segments. Due to the general increases in traffic volumes over the last 10 years along with the introduction of bypasses and roadway upgrades, only the most current (2000-2001) traffic volumes have been used in this analysis. This was done to obtain a value that best represents the actual conditions. Traffic counts along each highway segment were weighted based on the mean distance between traffic counters.

Table 3-3 shows the segment ranking for traffic volume, with highest AADT values ranking first. The results of truck traffic are also displayed in Table 3-3. A geographical representation of traffic volumes can be seen in Figure 3-4. It is to be noted that urban traffic has a large influence on the overall results.

Table 3-3
Traffic Volumes

ROUTE 11 AND ROUTE 17 NEEDS STUDY					
Segment			Traffic Volume (2000, 2001)		
Number	Description	Total Length (km)	Weighted Annual Average Daily Traffic (AADT)	Ranking	Weighted Annual Average Daily Truck Traffic (AADTT)
11-1	Miramichi to Burnt Church	31.17	3920	4	
11-2	Burnt Church to Tracadie-Sheila	34.61	3200	7	260
11-3	Tracadie-Sheila area (County Line to Route 160)	14.87	8130	1	
11-4	Route 160 to Blanchard Road	20.88	3600	6	
11-5	Blanchard Road to Bertrand	16.29	5380	2	
11-6	Bertrand to Janeville	40.73	2130	11	
11-7	Janeville to Bathurst	19.87	1820	13	
11-8	Bathurst to Belledune	41.14	5360	3	570
11-9	Belledune to Charlo	31.69	2740	8	
11-10	Charlo to Tide Head	44.33	3780	5	
17-1	Tide Head to Robinsonville	21.03	2170	10	
17-2	Robinsonville to Whites Brook	38.21	1350	15	
17-3	Whites Brook to Restigouche County Line	31.27	2230	9	
17-4	Restigouche / Victoria County Line to Victoria / Madawaska County Line	32.66	1470	14	330 ★
17-5	Victoria / Madawaska County Line to Saint-Léonard	24.69	1850	12	

Note: Ranking indicates segment of worst (Rank 1) to best condition (Rank 15).

The most recent data was used in the study, i.e. AADT and AADTT values for the years 2000 and 2001.

★ The latest available data for the AADTT values for this segment are for the year 1991.

Table 3-3
Traffic Volumes

ROUTE 11 AND ROUTE 17 NEEDS STUDY					
Segment			Traffic Volume (2000, 2001)		
Number	Description	Total Length (km)	Weighted Annual Average Daily Traffic (AADT)	Ranking	Weighted Annual Average Daily Truck Traffic (AADTT)
11-1	Miramichi to Burnt Church	31.17	3920	4	
11-2	Burnt Church to Tracadie-Sheila	34.61	3200	7	
11-3	Tracadie-Sheila area (County Line to Route 160)	14.87	8130	1	260
11-4	Route 160 to Blanchard Road	20.88	3600	6	
11-5	Blanchard Road to Bertrand	16.29	5380	2	
11-6	Bertrand to Janeville	40.73	2130	11	
11-7	Janeville to Bathurst	19.87	1820	13	
11-8	Bathurst to Belledune	41.14	5360	3	
11-9	Belledune to Charlo	31.69	2740	8	570
11-10	Charlo to Tide Head	44.33	3780	5	
17-1	Tide Head to Robinsonville	21.03	2170	10	
17-2	Robinsonville to Whites Brook	38.21	1350	15	
17-3	Whites Brook to Restigouche County Line	31.27	2230	9	
17-4	Restigouche / Victoria County Line to Victoria / Madawaska County Line	32.66	1470	14	330 ★
17-5	Victoria / Madawaska County Line to Saint-Léonard	24.69	1850	12	

Note: Ranking indicates segment of worst (Rank 1) to best condition (Rank 15).

The most recent data was used in the study, i.e. AADT and AADTT values for the years 2000 and 2001.

★ **The latest available data for the AADTT values for this segment are for the year 1991.**

Figure 3-4: Traffic Volumes

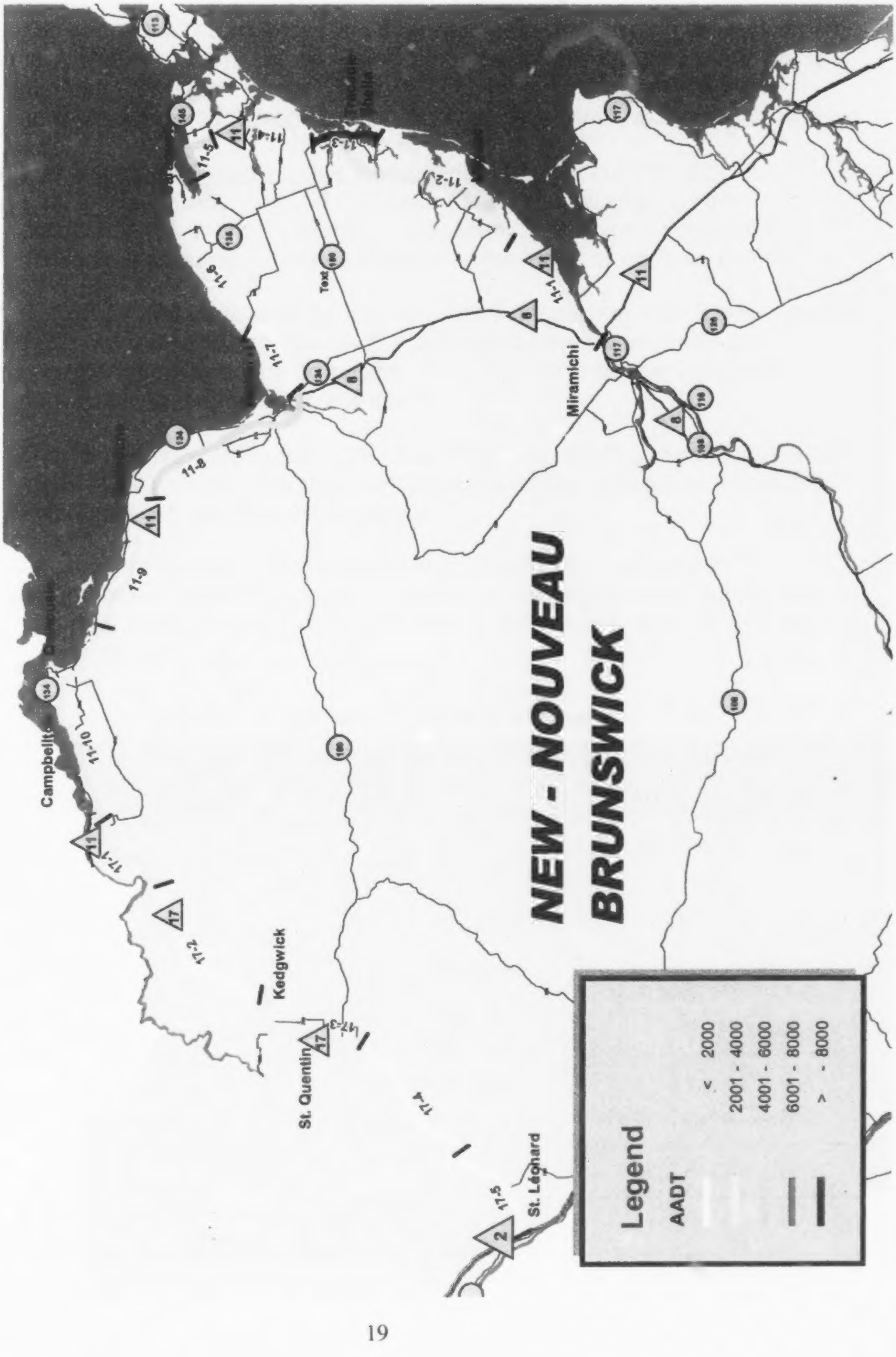
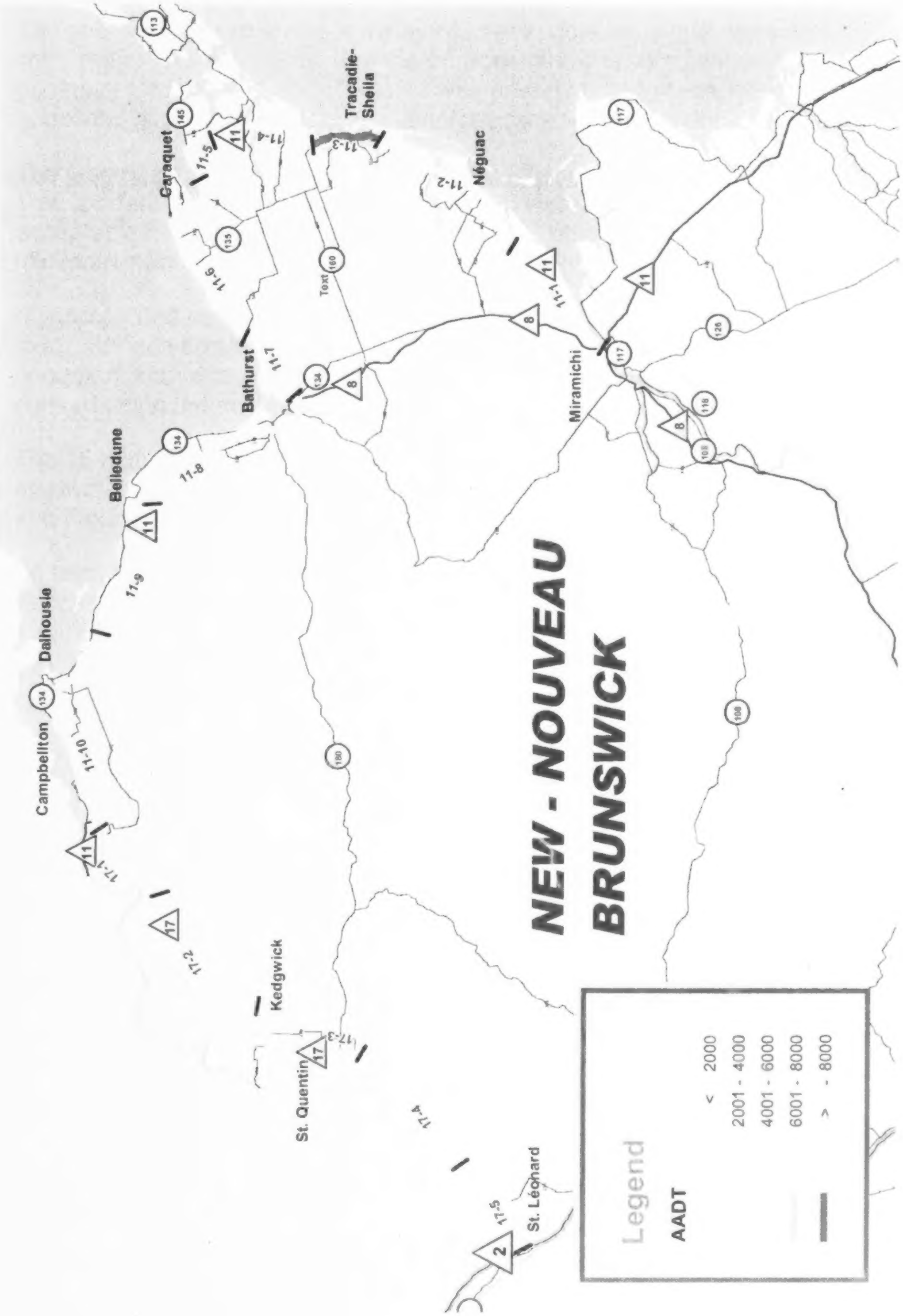

NEW - NOUVEAU
BRUNSWICK
Campbellton
Dalhousie
Kedgwick
St. Quentin
St. Léonard
Miramichi
Tracadie-Sheila
11-1
11-2
11-3
11-4
11-5
11-6
11-7
11-8
11-9
11-10
17-1
17-2
17-3
17-4
17-5
Legend
AADT
< 2000
2001 - 4000
4001 - 6000
6001 - 8000
> - 8000

Figure 3-4: Traffic Volumes


NEW - NOUVEAU BRUNSWICK
Legend
AADT
< 2000
2001 - 4000
4001 - 6000
6001 - 8000
> - 8000
Miramichi
Néguac
Tracadie-Sheila
Caraquet
Bathurst
Belledune
Dalhousie
Campbellton
Kedgwick
St. Quentin
St. Léonard
11-1
11-2
11-3
11-4
11-5
11-6
11-7
11-8
11-9
11-10
17-1
17-2
17-3
17-4
17-5
11
8
17
2
113
145
135
160
134
117
126
118
108
180

3.4 Surface and Shoulder Widths, Horizontal and Vertical Alignments (geometric indicator)

The geometry of a roadway is a major factor in determining its capacity to carry traffic volumes safely. For the purpose of this report, evaluation of geometry for Route 11 and Route 17 was based on four (4) aspects: horizontal alignment, vertical alignment, surface width, and shoulder width.

The Geometric Design Guide for Canadian Roads, published by the Transportation Association of Canada (TAC) was used to set the acceptable minimum standards for this study. Table 3-4 shows a list of minimum standards used to evaluate the geometry of each segment.

Horizontal and vertical alignment data were derived from GPS observations data. Surface and shoulder widths data were taken from existing documentation and verified on site. The geometric deficiencies were derived using the minimum standards.

The 15 highway segments were ranked by the percentage of kilometers of roadway not meeting the minimum highway design standards. Table 3-5 and Figure 3-5 represent this ranking.

As seen in Figure 3-5, older segments of roadway, especially in mountainous terrain, tend to have higher levels of geometric deficiencies. Segment ranking values range from 0% to 56% of the segment's length being deficient.

Table 3-4: Minimum Evaluation Standards

Location	Surface width	Shoulder width	Horizontal alignment	Vertical alignment
Rural **(90 km/h)**	3.7m /lane	2.75m	Radius of curve > 340m Length of curve > 270m	Sag K value > 30 Crest K value > 32 Length of curve > 90m Gradient < 4% flat terrain < 6% mountainous terrain
Urban **(50 km/h)**	3.7m /lane	2.4m	Radius of curve > 90m Length of curve > 150m	Sag K value > 4 Crest K value > 6 Length of curve > 50m Gradient < 8% flat terrain

Table 3-5
Geometric Deficiencies

ROUTE 11 AND ROUTE 17 NEEDS STUDY								
Segment			Geometric Criteria					
Number	Description	Total Length (km)	Length of Substandard Surface Width (<7.4m) and Slug (km)	Length of Substandard Shoulder Width (<2.75m Rural), (<2.4m Urban) (km)	Length of deficiencies (plan) (km)	Length of deficiencies (profile) (km)	Total Deficient Length (no overlap) (km)	Ranking
11-1	Miramichi to Burnt Church	31.17	0.00	2.47	0.23	0.05	2.75	11
11-2	Burnt Church to Tracadie-Sheila	34.61	0.00	5.96	0.55	0.64	6.66	9
11-3	Tracadie-Sheila area (County Line to Route 160)	14.87	1.00	1.00	0.54	0.00	1.54	10
11-4	Route 160 to Blanchard Road	20.88	8.10	8.10	0.87	0.74	9.27	7
11-5	Blanchard Road to Bertrand	16.29	3.32	0.00	0.00	0.23	3.55	8
11-6	Bertrand to Janeville	40.73	23.83	23.53	1.27	1.42	24.24	4
11-7	Janeville to Bathurst	19.87	0.00	0.00	0.00	0.00	0.00	14
11-8	Bathurst to Belledune	41.14	0.16	0.16	0.00	0.08	0.24	13
11-9	Belledune to Charlo	31.69	0.00	0.00	0.00	0.00	0.00	14
11-10	Charlo to Tide Head	44.33	1.00	0.00	0.00	0.00	1.00	12
17-1	Tide Head to Robinsonville	21.03	8.54	8.54	3.24	3.01	9.49	6
17-2	Robinsonville to Whites Brook	38.21	15.98	2.67	1.67	4.23	19.39	5
17-3	Whites Brook to Restigouche County Line	31.27	23.27	10.43	0.10	0.58	23.47	3
17-4	Restigouche / Victoria County Line to Victoria / Madawaska County Line	32.66	25.16	0.00	1.80	6.58	25.59	2
17-5	Victoria / Madawaska County Line to Saint-Léonard	24.69	11.11	14.33	0.96	4.95	20.09	1

Note: Ranking indicates segment of worst (Rank 1) to best condition (Rank 15).

Figure 3-5: Geometric Deficiencies

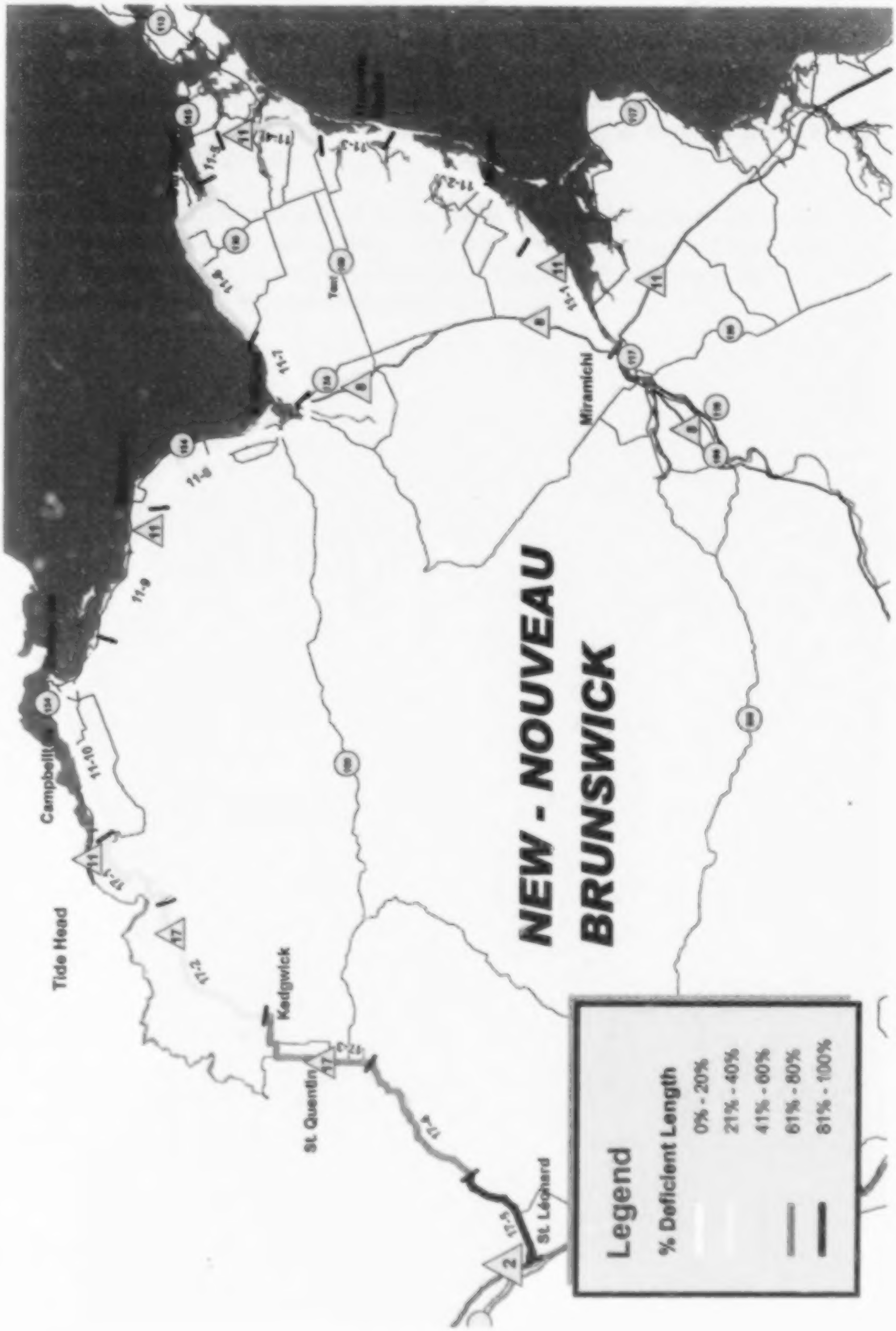
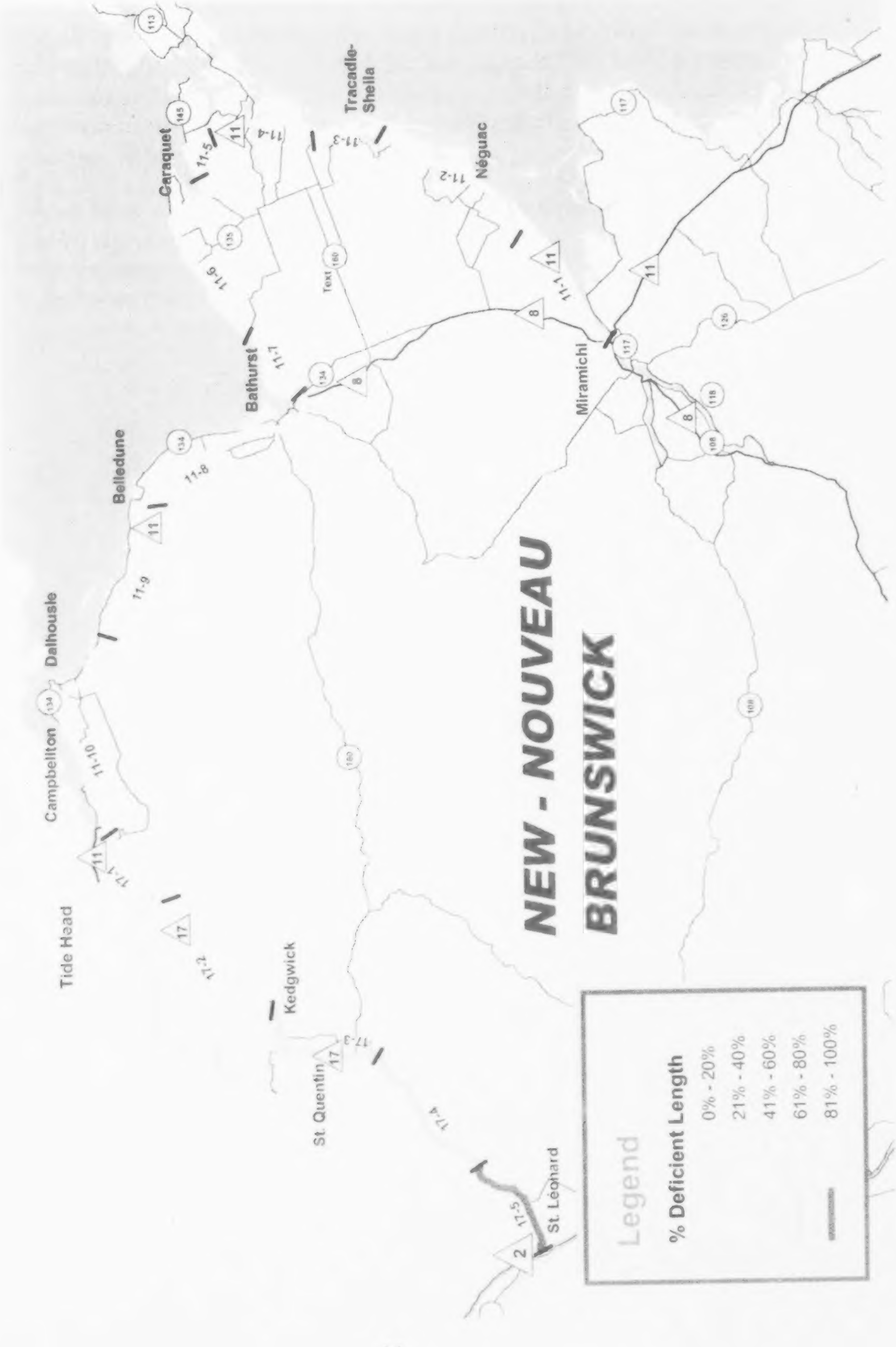

NEW - NOUVEAU
BRUNSWICK
Legend
% Deficient Length
0% - 20%
21% - 40%
41% - 60%
61% - 80%
81% - 100%
Miramichi
Campbellton
Tide Head
Kedgwick
St Quentin
St Léonard
11-1
11-2
11-3
11-4
11-5
11-6
11-7
11-8
11-9
11-10
17-1
17-2
17-3
17-4
17-5
11
17
8
2

Figure 3-5: Geometric Deficiencies


NEW - NOUVEAU
BRUNSWICK
Caraquet
Tracadie-Sheila
Néguac
Bathurst
Miramichi
Belledune
Dalhousie
Campbellton
Tide Head
Kedgwick
St. Quentin
St. Léonard
11-1
11-2
11-3
11-4
11-5
11-6
11-7
11-8
11-9
11-10
17-1
17-2
17-3
17-4
17-5
11
8
17
2
113
145
135
160
134
117
126
118
108
180
Legend
% Deficient Length
0% - 20%
21% - 40%
41% - 60%
61% - 80%
81% - 100%

3.5 Posted Speed (travel time indicator)

Travel time is an indicator of how effective a section of highway is at handling volumes of traffic. If a major portion of highway has a reduced posted speed because of roadside development or poor geometry, it will be reflected in the results of this analysis. No distinction has been made between urban and rural segment classifications. This must be considered when viewing the results.

Travel time was calculated based on the actual posted speed for each of the 15 highway segment lengths. The average posted speed was used to rank the segments as seen in Table 3-6. Figure 3-6 geographically represents the average posted speed per segment.

Table 3-6
Posted Speed

ROUTE 11 AND ROUTE 17 NEEDS STUDY				
Segment			Travel Time	
Number	Description	Total Length (km)	Average Posted Speed (km/h)	Ranking
11-1	Miramichi to Burnt Church	31.17	88.4	10
11-2	Burnt Church to Tracadie-Sheila	34.61	74.8	3
11-3	Tracadie-Sheila area (County Line to Route 160)	14.87	67.2	1
11-4	Route 160 to Blanchard Road	20.88	80.8	6
11-5	Blanchard Road to Bertrand	16.29	68.1	2
11-6	Bertrand to Janeville	40.73	83.8	7
11-7	Janeville to Bathurst	19.87	98.4	12
11-8	Bathurst to Belledune	41.14	99.1	13
11-9	Belledune to Charlo	31.69	100.0	15
11-10	Charlo to Tide Head	44.33	99.7	14
17-1	Tide Head to Robinsonville	21.03	80.0	5
17-2	Robinsonville to Whites Brook	38.21	86.6	8
17-3	Whites Brook to Restigouche County Line	31.27	78.5	4
17-4	Restigouche / Victoria County Line to Victoria / Madawaska County Line	32.66	90.0	11
17-5	Victoria / Madawaska County Line to Saint-Léonard	24.69	87.3	9

Note: Ranking indicates segment of worst (Rank 1) to best condition (Rank 15).

Figure 3-6: Posted Speed

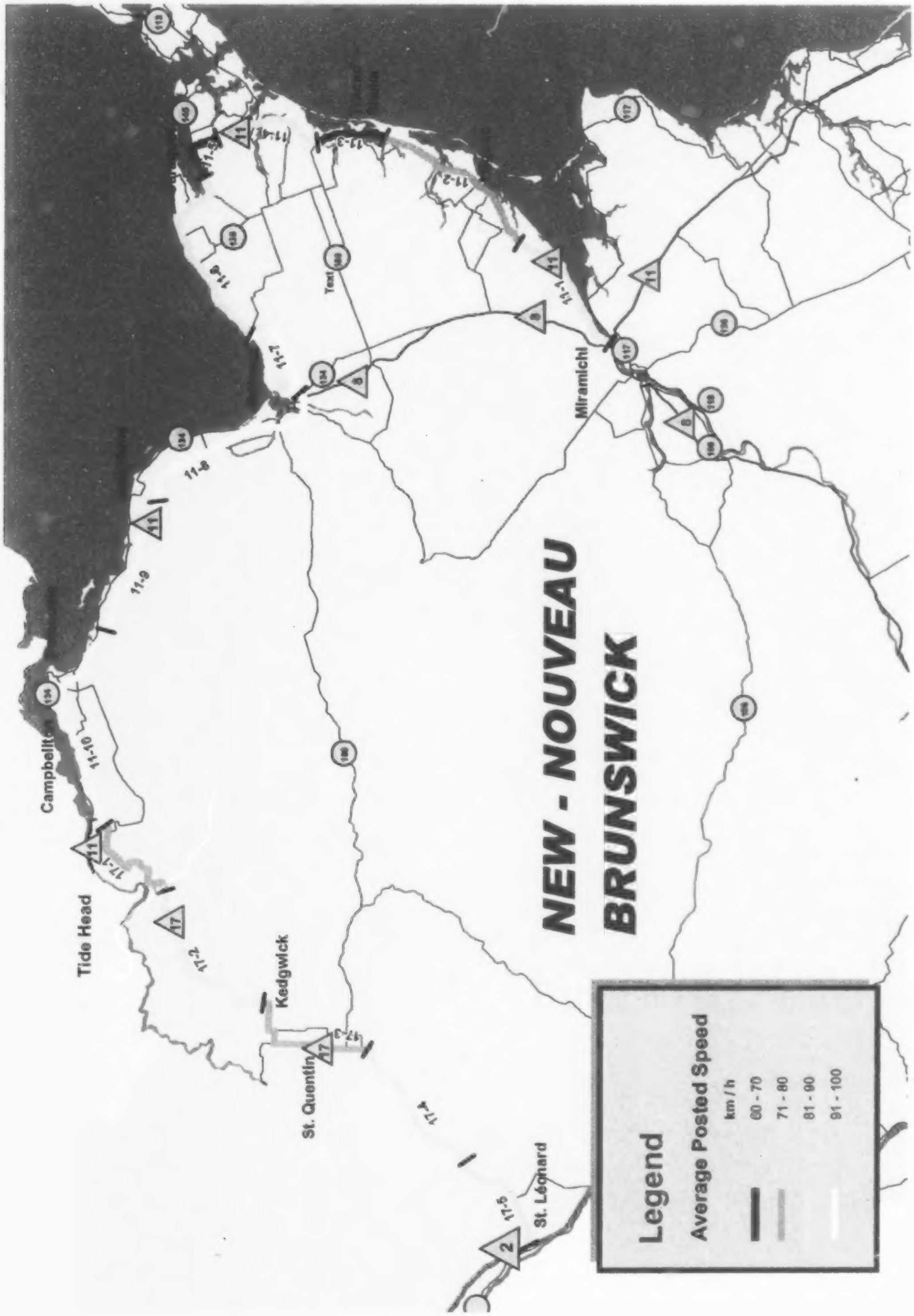
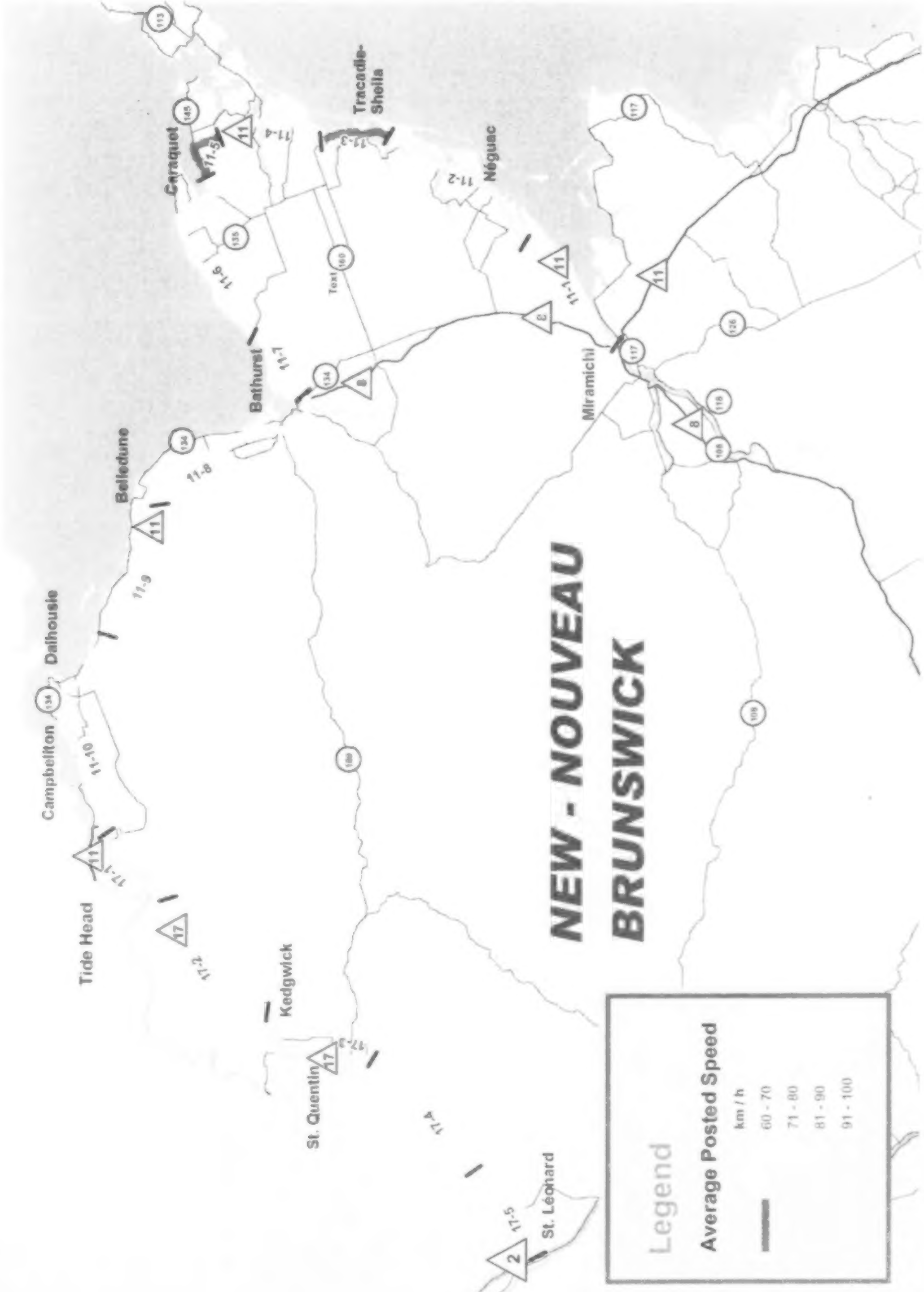

NEW - NOUVEAU BRUNSWICK
Campbellton
Tide Head
Kedgwick
St. Quentin
St. Léonard
Miramichi
11-1
11-2
11-3
11-6
11-7
11-8
11-9
11-10
17-1
17-2
17-3
17-4
17-5
Legend
Average Posted Speed
km / h
60 - 70
71 - 80
81 - 90
91 - 100

Figure 3-6: Posted Speed


NEW - NOUVEAU
BRUNSWICK
Legend
Average Posted Speed
km / h
60 - 70
71 - 80
81 - 90
91 - 100
Caraquet
Tracadie-Sheila
Néguac
Miramichi
Bathurst
Belledune
Dalhousie
Campbellton
Tide Head
Kedgwick
St. Quentin
St. Léonard
11-1
11-2
11-3
11-4
11-5
11-6
11-7
11-8
11-9
11-10
17-1
17-2
17-3
17-4
17-5
11
17
8
2
113
145
135
160
134
117
126
118
108
180

3.6 Overall Summary of Criteria Results

By viewing the results of the five (5) evaluation criteria individually, the geographical areas requiring attention differ from criterion to criterion. In order to summarize the findings, an overall assessment within the study corridor was performed. A weighted formula was generated keeping in mind the relative importance of each criterion.

The collision rate criterion was given a 30% weight because of its importance. A reduction in the number of collisions on highways in the province of New Brunswick is a main objective of NBDOT's strategic plan. The geometric criterion was also given a 30% weight since it is the only criterion where remedial measures along the existing highway alignment can be applied. By improving the geometry of a highway segment, all other criteria with the exception of posted speed (urban areas) and traffic volumes, will be influenced positively.

Passing restrictions and posted speed were given equal weight of 15%. They are directly related since increasing the passing opportunity should reduce the travel time. Travel time however, is still influenced mainly by the fact that the roadway network serves many urban communities with relatively low posted speeds.

In general, the overall traffic volumes are low with respect to other provincial arterial highways. They also vary between segments. Applying a large weight coefficient would shift the results for no justifiable reason. In order to minimize this effect, a 10% weight is given to the traffic volume parameter. The following Table 3-7 shows the five (5) evaluation criteria with their respective weights.

Table 3-7: Criteria Weighting

Criteria	Weight
Safety / Collision Rates	30%
Service / Passing Restrictions	15%
Economic / Traffic Volumes	10%
Geometry / Surface and Shoulder Width, Horizontal and Vertical Alignments	30%
Travel Time / Posted Speed	15%

The overall ranking results of the five (5) evaluation criteria, sorted by segment, can be viewed in Table 3-8. Table 3-9 shows the same information with the segments sorted by rank. A sensitivity analysis was carried out. The weighting formula used for the criteria was modified, creating four (4) other scenarios. Even by changing the weighting formula, there were no remarkable changes in the overall ranking. This sensitivity analysis can be found in Appendix C.

Figure 3-7 displays the overall criteria ranking of the 15 segments in groups of three (3). It is important to note that the overall rank of each of the fifteen (15) segments only determines the relative priority of each complete segment as compared to the other segments in their entirety. It is not intended to be used as the sole or primary tool in developing an overall highway improvement plan for the highway network under study as there are different improvement strategies required, even within each highway segment.

The actual capital improvement plan for any given budget year will be based upon a wide variety of factors such as specific needs within segments, land availability, route planning and design requirements, structure and bridge replacement scheduling, continuity with adjacent segment improvements, environmental approvals, and available funding.

Table 3-8
Overall Ranking By Segment

ROUTE 11 AND ROUTE 17 NEEDS STUDY								
Segment			OVERALL RANKING					
Number	Description	Total Length (km)	Collision Rate (30%)	Passing Restrictions (15%)	Traffic Volumes (10%)	Geometric Deficiencies (30%)	Posted Speed (15%)	OVERALL RANKING
11-1	Miramichi to Burnt Church	31.17	9	15	4	11	10	11
11-2	Burnt Church to Tracadie-Sheila	34.61	4	14	7	9	3	9
11-3	Tracadie-Sheila area (County Line to Route 160)	14.87	1	6	1	10	1	2
11-4	Route 160 to Blanchard Road	20.88	5	11	6	7	6	6
11-5	Blanchard Road to Bertrand	16.29	2	4	2	8	2	1
11-6	Bertrand to Janeville	40.73	6	10	11	4	7	5
11-7	Janeville to Bathurst	19.87	15	13	13	14	12	15
11-8	Bathurst to Belledune	41.14	11	7	3	13	13	12
11-9	Belledune to Charlo	31.69	14	12	8	14	15	14
11-10	Charlo to Tide Head	44.33	12	8	5	12	14	13
17-1	Tide Head to Robinsonville	21.03	13	2	10	6	5	10
17-2	Robinsonville to Whites Brook	38.21	7	5	15	5	8	7
17-3	Whites Brook to Restigouche County Line	31.27	3	9	9	3	4	3
17-4	Restigouche / Victoria County Line to Victoria / Madawaska County Line	32.66	10	3	14	2	11	8
17-5	Victoria / Madawaska County Line to Saint-Léonard	24.69	8	1	12	1	9	4

Note: Ranking indicates segment of worst (Rank 1) to best condition (Rank 15).

Table 3-8
Overall Ranking By Segment

ROUTE 11 AND ROUTE 17 NEEDS STUDY								
Segment			OVERALL RANKING					
Number	Description	Total Length (km)	Collision Rate (30%)	Passing Restrictions (15%)	Traffic Volumes (10%)	Geometric Deficiencies (30%)	Posted Speed (15%)	OVERALL RANKING
11-1	Miramichi to Burnt Church	31.17	9	15	4	11	10	11
11-2	Burnt Church to Tracadie-Sheila	34.61	4	14	7	9	3	9
11-3	Tracadie-Sheila area (County Line to Route 160)	14.87	1	6	1	10	1	2
11-4	Route 160 to Blanchard Road	20.88	5	11	6	7	6	6
11-5	Blanchard Road to Bertrand	16.29	2	4	2	8	2	1
11-6	Bertrand to Janeville	40.73	6	10	11	4	7	5
11-7	Janeville to Bathurst	19.87	15	13	13	14	12	15
11-8	Bathurst to Belledune	41.14	11	7	3	13	13	12
11-9	Belledune to Charlo	31.69	14	12	8	14	15	14
11-10	Charlo to Tide Head	44.33	12	8	5	12	14	13
17-1	Tide Head to Robinsonville	21.03	13	2	10	6	5	10
17-2	Robinsonville to Whites Brook	38.21	7	5	15	5	8	7
17-3	Whites Brook to Restigouche County Line	31.27	3	9	9	3	4	3
17-4	Restigouche / Victoria County Line to Victoria / Madawaska County Line	32.66	10	3	14	2	11	8
17-5	Victoria / Madawaska County Line to Saint-Léonard	24.69	8	1	12	1	9	4

Note: Ranking indicates segment of worst (Rank 1) to best condition (Rank 15).

Table 3-9
Overall Ranking by Rank

ROUTE 11 AND ROUTE 17 NEEDS STUDY								
				CRITERIA RANKING				
OVERALL RANKING	Number		Total Length (km)	Collision Rate (30%)	Passing Restrictions (15%)	Traffic Volume (10%)	Geometric Deficiencies (30%)	Posted Speed (15%)
1	11-5	Blanchard Road to Bertrand	16.29	2	4	2	8	2
2	11-3	Tracadie-Sheila area (County Line to Route 160)	14.87	1	6	1	10	1
3	17-3	Whites Brook to Restigouche County Line	31.27	3	9	9	3	4
4	17-5	Victoria / Madawaska County Line to Saint-Léonard	24.69	8	1	12	1	9
5	11-6	Bertrand to Janeville	40.73	6	10	11	4	7
6	11-4	Route 160 to Blanchard Road	20.88	5	11	6	7	6
7	17-2	Robinsonville to Whites Brook	38.21	7	5	15	5	8
8	17-4	Restigouche / Victoria County Line to Victoria / Madawaska County Line	32.66	10	3	14	2	11
9	11-2	Burnt Church to Tracadie-Sheila	34.61	4	14	7	9	3
10	17-1	Tide Head to Robinsonville	21.03	13	2	10	6	5
11	11-1	Miramichi to Burnt Church	31.17	9	15	4	11	10
12	11-8	Bathurst to Belledune	41.14	11	7	3	13	13
13	11-10	Charlo to Tide Head	44.33	12	8	5	12	14
14	11-9	Belledune to Charlo	31.69	14	12	8	14	15
15	11-7	Janeville to Bathurst	19.87	15	13	13	14	12

Note: Ranking indicates segment of worst (Rank 1) to best condition (Rank 15).

Figure 3-7: Overall Ranking

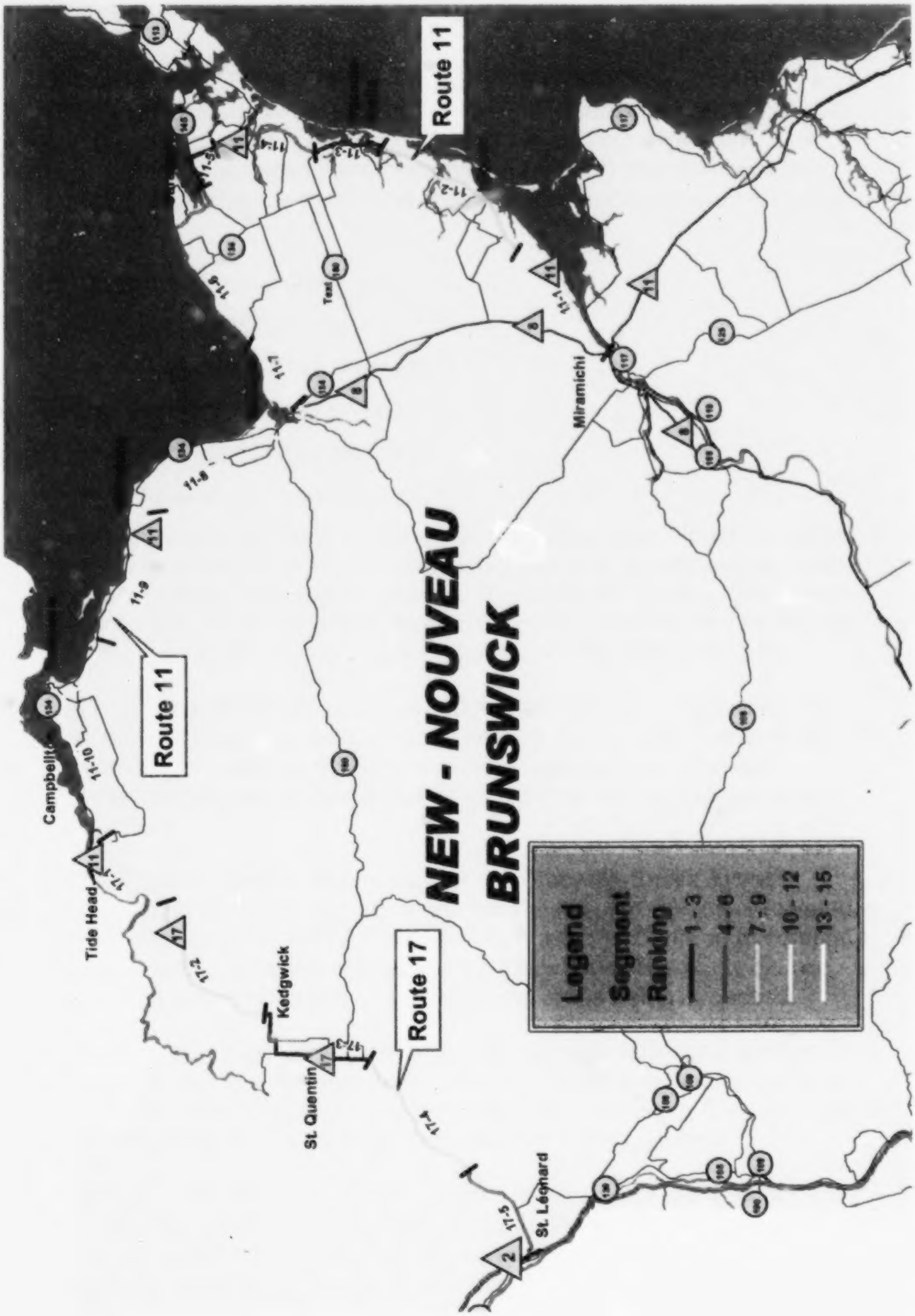
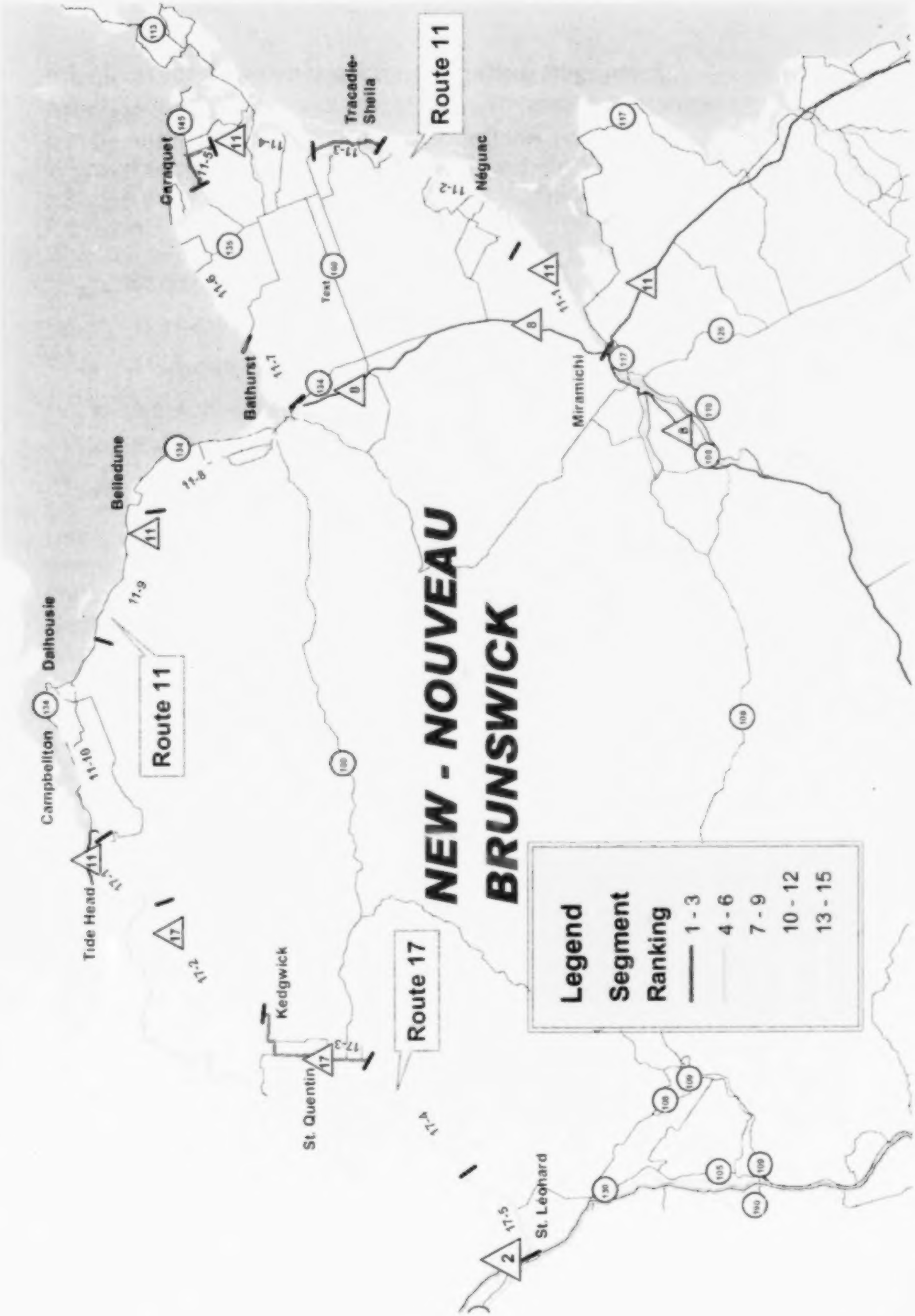

Route 11
Route 11
Route 17
NEW - NOUVEAU BRUNSWICK
Miramichi
Campbellton
Tide Head
Kedgwick
St. Quentin
St. Léonard
11-1
11-2
11-3
11-4
11-5
11-6
11-7
11-8
11-9
11-10
17-1
17-2
17-3
17-4
17-5
Legend
Segment Ranking
1 - 3
4 - 6
7 - 9
10 - 12
13 - 15

Figure 3-7: Overall Ranking


Route 11
Tracadie-Sheila
Caraquet
Néguac
Bathurst
Belledune
Dalhousie
Campbellton
Tide Head
Kedgwick
St. Quentin
St. Léonard
Miramichi
Route 11
Route 17
NEW - NOUVEAU BRUNSWICK
11-1
11-2
11-3
11-4
11-5
11-6
11-7
11-8
11-9
11-10
17-1
17-2
17-3
17-4
17-5
Legend
Segment Ranking
1 - 3
4 - 6
7 - 9
10 - 12
13 - 15

4.0 IMPROVEMENT STRATEGIES

4.1 Correct Deficiencies along Existing Alignment

Although the study is evaluated on five (5) different criterion, only geometry can be used to rectify deficiencies along the existing alignment. The improvement strategies have been derived directly from the geometric criterion evaluation as seen in section 3-4. The improvements include the following:

- Shoulder Widening;
- Surface Widening;
- Horizontal Curve Remediation;
- Vertical Curve Remediation;
- Addition of Climbing Lane;
- Addition of Passing Lane.

Using order-of-magnitude cost estimates as previously shown in Table 2-3, which are based on recent construction projects of similar nature, each improvement or remediation measure has been assigned a dollar value. Sections 4.1.1 to 4.1.3 identify the deficiencies, improvement strategies, and costing of improvement options for the 15 highway segments.

It is to be noted that areas where deficiencies are due to encroaching roadside development rather than geometric deficiencies, will probably not be corrected by applying the above noted improvement strategies. Potential strategies for new highway alignments will be addressed in Section 4.2.

NBDOT has budgeted $6.6 million for the Tracadie-Sheila Bypass (Segment 11-3) which is to be opened in the fall of 2003 and completed in the summer of 2004. NBDOT has also budgeted $6.5 million to complete the Squaw Cap Diversion (Segment 17-1) by 2004. The study did not consider any improvement strategies in the areas being bypassed.

In order to show the cost of correcting deficiencies along the existing alignment, the 15 segments have been regrouped into the original three sections: Route 11, from Miramichi to Bathurst, Route 11, from Bathurst to Tide Head, and Route 17, from Tide Head to Saint-Léonard.

The improvements along highway sections have been identified where the minimum standards of 90 km/h design speed in rural areas, and a 50 km/h in urban areas, are not met. The improvement costs, however, are calculated using a 100 km/h and 60 km/h design speed respectively, in order to meet future traffic demands.

4.1.1 Route 11 - Acadian Peninsula

The Acadian Peninsula segment of Route 11 has historically been the link from community to community following the coast. Over the years, roadside development has increased to the point of impeding traffic flow.

A new bypass portion of Route 11 in segment 11-3, Tracadie-Sheila area, will be in service in the fall of 2003. This will alleviate the current urban traffic congestion throughout the segment.

Tables 4-1 to 4-7 show the required remediation cost to meet RAU 100 standards in rural areas and a 60 km/h design speed in urban areas. The overall remediation length of this section is 49.8 km with 31% relating to alignment deficiencies.

The remaining cost to complete the Tracadie-Sheila Bypass has been included in this study. Cost for remediation work on the portion of existing Route 11 being bypassed in this segment has been removed from the overall cost of improvements.

The Department of Transportation's Highway Bridge and Highway Pavement Rehabilitation program identifies an additional 56.3 km of pavement rehabilitation and the replacement of Waugh River Bridge.

Table 4-1: Segment 11-1 Improvement Strategies & Costs, Existing Alignment

Segment no.:	**11-1**
Total Length:	**31.17 km**
Description:	**Route 11, Miramichi to Burnt Church**

Geometry	Length of Deficiencies (km)	Required Length of Improvement (km)	Average Unit Cost ($)	Total Cost ($)
Surface widening	0.000	0.000	200,000	0
Shoulder widening	2.470	0.550	75,000	41,000
Vertical	0.050	0.100	1,350,000	135,000
Horizontal (Minor)	0.226	0.900	750,000	675,000
Horizontal (Major)	0.000	0.000	1,500,000	0
			Subtotal	851,000

Auxiliary Lanes	Required Length of Improvement (km)	Average Unit Cost ($)	Total Cost ($)
Truck Climbing Lane (1)	0.000	1,850,000	0
Truck Climbing Lane (2)	0.000	350,000	0
Passing Lane	0.000	350,000	0
By-pass	0.000		0
Interchange Repair	0.000		0
		Subtotal	0

Rehab Program	Quantity	Average Unit Cost ($)	Total Cost ($)
Asphalt Concrete	23.40 km	200,000	4,680,800
Structure	0	1,000,000	0
		Subtotal	4,680,800

Total Cost	$5,530,000

Table 4-1: Segment 11-1 Improvement Strategies & Costs, Existing Alignment

Segment no.:	**11-1**
Total Length:	**31.17 km**
Description:	**Route 11, Miramichi to Burnt Church**

Geometry	Length of Deficiencies (km)	Required Length of Improvement (km)	Average Unit Cost ($)	Total Cost ($)
Surface widening	0.000	0.000	200,000	0
Shoulder widening	2.470	0.550	75,000	41,000
Vertical	0.050	0.100	1,350,000	135,000
Horizontal (Minor)	0.226	0.900	750,000	675,000
Horizontal (Major)	0.000	0.000	1,500,000	0
			Subtotal	851,000

Auxiliary Lanes	Required Length of Improvement (km)	Average Unit Cost ($)	Total Cost ($)
Truck Climbing Lane (1)	0.000	1,850,000	0
Truck Climbing Lane (2)	0.000	350,000	0
Passing Lane	0.000	350,000	0
By-pass	0.000		0
Interchange Repair	0.000		0
		Subtotal	0

Rehab Program	Quantity	Average Unit Cost ($)	Total Cost ($)
Asphalt Concrete	23.40 km	200,000	4,680,800
Structure	0	1,000,000	0
		Subtotal	4,680,800

Total Cost	$5,530,000

Table 4-2: Segment 11-2 Improvement Strategies & Costs, Existing Alignment

Segment no.:	**11-2**
Total Length:	**34.61 km**
Description:	**Route 11, Burnt Church to Tracadie-Sheila**

Geometry	Length of Deficiencies (km)	Required Length of Improvement (km)	Average Unit Cost ($)	Total Cost ($)
Surface widening	0.000	0.000	200,000	0
Shoulder widening	5.962	0.537	75,000	40,000
Vertical	0.635	1.380	1,350,000	1,863,000
Horizontal (Minor)	0.551	1.893	750,000	1,420,000
Horizontal (Major)	0.000	0.000	1,500,000	0
			Subtotal	3,323,000

Auxiliary Lanes	Required Length of Improvement (km)	Average Unit Cost ($)	Total Cost ($)
Truck Climbing Lane (1)	0.000	1,850,000	0
Truck Climbing Lane (2)	0.000	350,000	0
Passing Lane	0.000	350,000	0
By-pass	0.000		0
Interchange Repair	0.000		0
		Subtotal	0

Rehab Program	Quantity	Average Unit Cost ($)	Total Cost ($)
Asphalt Concrete	6.25 km	200,000	1,250,200
Structure	2	1,250,000	2,500,000
		Subtotal	3,750,200

Total Cost	$7,070,000

Table 4-2: Segment 11-2 Improvement Strategies & Costs, Existing Alignment

Segment no.:	**11-2**
Total Length:	**34.61 km**
Description:	**Route 11, Burnt Church to Tracadie-Sheila**

Geometry	Length of Deficiencies (km)	Required Length of Improvement (km)	Average Unit Cost ($)	Total Cost ($)
Surface widening	0.000	0.000	200,000	0
Shoulder widening	5.962	0.537	75,000	40,000
Vertical	0.635	1.380	1,350,000	1,863,000
Horizontal (Minor)	0.551	1.893	750,000	1,420,000
Horizontal (Major)	0.000	0.000	1,500,000	0
			Subtotal	3,323,000

Auxiliary Lanes	Required Length of Improvement (km)	Average Unit Cost ($)	Total Cost ($)
Truck Climbing Lane (1)	0.000	1,850,000	0
Truck Climbing Lane (2)	0.000	350,000	0
Passing Lane	0.000	350,000	0
By-pass	0.000		0
Interchange Repair	0.000		0
		Subtotal	0

Rehab Program	Quantity	Average Unit Cost ($)	Total Cost ($)
Asphalt Concrete	6.25 km	200,000	1,250,200
Structure	2	1,250,000	2,500,000
		Subtotal	3,750,200

Total Cost	$7,070,000

Table 4-3: Segment 11-3 Improvement Strategies & Costs, Existing Alignment and Bypass

Segment no.:	**11-3**
Total Length:	**14.87 km**
Description:	**Route 11, Tracadie-Sheila area (County Line to Route 160)**

Geometry	Length of Deficiencies (km)	Required Length of Improvement (km)	Average Unit Cost ($)	Total Cost ($)
Surface widening	1.000	1.000	200,000	200,000
Shoulder widening	1.000	0.000	75,000	0
Vertical	0.000	0.000	1,350,000	0
Horizontal (Minor)	0.536	1.500	750,000	1,125,000
Horizontal (Major)	0.000	0.000	1,500,000	0
			Subtotal	1,325,000

Auxiliary Lanes	Required Length of Improvement (km)	Average Unit Cost ($)	Total Cost ($)
Truck Climbing Lane (1)	0.000	1,850,000	0
Truck Climbing Lane (2)	0.000	350,000	0
Passing Lane	0.000	350,000	0
By-pass	0.000		6,600,000
Interchange Repair	0.000		0
		Subtotal	6,600,000

Rehab Program	Quantity	Average Unit Cost ($)	Total Cost ($)
Asphalt Concrete	0.07 km	200,000	14,600
Structure	0	1,000,000	0
		Subtotal	14,600

Total Cost	**$7,940,000**

NOTES:

* Tracadie-Sheila ByPass is planned to be opened to vehicular traffic in the fall of 2003.
The estimated cost to complete this diversion is approximately **$6.6 Million**.
Unit price for surface widening in this segment allows for placement of a 0.8m slug, milling, and resurfacing.

Table 4-3: Segment 11-3 Improvement Strategies & Costs, Existing Alignment and Bypass

Segment no.:	**11-3**
Total Length:	**14.87 km**
Description:	**Route 11, Tracadie-Sheila area (County Line to Route 160)**

Geometry	Length of Deficiencies (km)	Required Length of Improvement (km)	Average Unit Cost ($)	Total Cost ($)
Surface widening	1.000	1.000	200,000	200,000
Shoulder widening	1.000	0.000	75,000	0
Vertical	0.000	0.000	1,350,000	0
Horizontal (Minor)	0.536	1.500	750,000	1,125,000
Horizontal (Major)	0.000	0.000	1,500,000	0
			Subtotal	1,325,000

Auxiliary Lanes	Required Length of Improvement (km)	Average Unit Cost ($)	Total Cost ($)
Truck Climbing Lane (1)	0.000	1,850,000	0
Truck Climbing Lane (2)	0.000	350,000	0
Passing Lane	0.000	350,000	0
By-pass	0.000		6,600,000
Interchange Repair	0.000		0
		Subtotal	6,600,000

Rehab Program	Quantity	Average Unit Cost ($)	Total Cost ($)
Asphalt Concrete	0.07 km	200,000	14,600
Structure	0	1,000,000	0
		Subtotal	14,600

Total Cost	$7,940,000

NOTES:

* Tracadie-Sheila ByPass is planned to be opened to vehicular traffic in the fall of 2003.
The estimated cost to complete this diversion is approximately **$6.6 Million**.
Unit price for surface widening in this segment allows for placement of a 0.8m slug, milling, and resurfacing.

Table 4-4: Segment 11-4 Improvement Strategies & Costs, Existing Alignment

Segment no.: **11-4**
Total Length: **20.88 km**
Description: **Route 11, Route 160 to Blanchard Road**

Geometry	Length of Deficiencies (km)	Required Length of Improvement (km)	Average Unit Cost ($)	Total Cost ($)
Surface widening	8.100	7.395	200,000	1,479,000
Shoulder widening	8.100	0.000	75,000	0
Vertical	0.744	1.118	1,350,000	1,509,000
Horizontal (Minor)	0.565	1.075	750,000	806,000
Horizontal (Major)	0.308	0.361	1,500,000	541,125
			Subtotal	4,335,125

Auxiliary Lanes	Required Length of Improvement (km)	Average Unit Cost ($)	Total Cost ($)
Truck Climbing Lane (1)	0.000	1,850,000	0
Truck Climbing Lane (2)	0.000	350,000	0
Passing Lane	0.000	350,000	0
By-pass	0.000		0
Interchange Repair	0.000		0
		Subtotal	0

Rehab Program	Quantity	Average Unit Cost ($)	Total Cost ($)
Asphalt Concrete	3.53 km	200,000	706,000
Structure	1	1,200,000	1,200,000
		Subtotal	1,906,000

Total Cost	$6,240,000

NOTE:
Unit price for surface widening in this segment allows for placement of a 0.8m slug, milling, and resurfacing.

Table 4-4: Segment 11-4 Improvement Strategies & Costs, Existing Alignment

Segment no.: 11-4
Total Length: 20.88 km
Description: Route 11, Route 160 to Blanchard Road

Geometry	Length of Deficiencies (km)	Required Length of Improvement (km)	Average Unit Cost ($)	Total Cost ($)
Surface widening	8.100	7.395	200,000	1,479,000
Shoulder widening	8.100	0.000	75,000	0
Vertical	0.744	1.118	1,350,000	1,509,000
Horizontal (Minor)	0.565	1.075	750,000	806,000
Horizontal (Major)	0.308	0.361	1,500,000	541,125
			Subtotal	4,335,125

Auxiliary Lanes	Required Length of Improvement (km)	Average Unit Cost ($)	Total Cost ($)
Truck Climbing Lane (1)	0.000	1,850,000	0
Truck Climbing Lane (2)	0.000	350,000	0
Passing Lane	0.000	350,000	0
By-pass	0.000		0
Interchange Repair	0.000		0
		Subtotal	0

Rehab Program	Quantity	Average Unit Cost ($)	Total Cost ($)
Asphalt Concrete	3.53 km	200,000	706,000
Structure	1	1,200,000	1,200,000
		Subtotal	1,906,000

Total Cost	$6,240,000

NOTE:
Unit price for surface widening in this segment allows for placement of a 0.8m slug, milling, and resurfacing.

Table 4-5: Segment 11-5 Improvement Strategies & Costs, Existing Alignment

Segment no.:	**11-5**
Total Length:	**16.29 km**
Description:	**Route 11, Blanchard Road to Bertrand**

Geometry	Length of Deficiencies (km)	Required Length of Improvement (km)	Average Unit Cost ($)	Total Cost ($)
Surface widening	3.324	3.324	200,000	665,000
Shoulder widening	0.000	0.000	75,000	0
Vertical	0.225	0.371	1,350,000	501,000
Horizontal (Minor)	0.000	0.000	750,000	0
Horizontal (Major)	0.000	0.000	1,500,000	0
			Subtotal	1,166,000

Auxiliary Lanes	Required Length of Improvement (km)	Average Unit Cost ($)	Total Cost ($)
Truck Climbing Lane (1)	0.000	1,850,000	0
Truck Climbing Lane (2)	0.000	350,000	0
Passing Lane	0.000	350,000	0
By-pass	0.000		0
Interchange Repair	0.000		0
		Subtotal	0

Rehab Program	Quantity	Average Unit Cost ($)	Total Cost ($)
Asphalt Concrete	0.61 km	200,000	122,800
Structure	0	1,000,000	0
		Subtotal	122,800

Total Cost	**$1,290,000**

NOTE:
Unit price for surface widening in this segment allows for placement of a 0.8m slug, milling, and resurfacing.

Table 4-5: Segment 11-5 Improvement Strategies & Costs, Existing Alignment

Segment no.: **11-5**

Total Length: **16.29 km**

Description: **Route 11, Blanchard Road to Bertrand**

Geometry	Length of Deficiencies (km)	Required Length of Improvement (km)	Average Unit Cost ($)	Total Cost ($)
Surface widening	3.324	3.324	200,000	665,000
Shoulder widening	0.000	0.000	75,000	0
Vertical	0.225	0.371	1,350,000	501,000
Horizontal (Minor)	0.000	0.000	750,000	0
Horizontal (Major)	0.000	0.000	1,500,000	0
			Subtotal	1,166,000

Auxiliary Lanes	Required Length of Improvement (km)	Average Unit Cost ($)	Total Cost ($)
Truck Climbing Lane (1)	0.000	1,850,000	0
Truck Climbing Lane (2)	0.000	350,000	0
Passing Lane	0.000	350,000	0
By-pass	0.000		0
Interchange Repair	0.000		0
		Subtotal	0

Rehab Program	Quantity	Average Unit Cost ($)	Total Cost ($)
Asphalt Concrete	0.61 km	200,000	122,800
Structure	0	1,000,000	0
		Subtotal	122,800

Total Cost	$1,290,000

NOTE:
Unit price for surface widening in this segment allows for placement of a 0.8m slug, milling, and resurfacing.

Table 4-6: Segment 11-6 Improvement Strategies & Costs, Existing Alignment

Segment no.: 11-6
Total Length: 40.73 km
Description: Route 11, Bertrand to Janeville

Geometry	Length of Deficiencies (km)	Required Length of Improvement (km)	Average Unit Cost ($)	Total Cost ($)
Surface widening	23.831	21.487	200,000	4,297,000
Shoulder widening	23.531	0.000	75,000	0
Vertical	1.424	2.529	1,350,000	3,413,000
Horizontal (Minor)	1.273	4.271	750,000	3,203,000
Horizontal (Major)	0.000	0.000	1,500,000	0
			Subtotal	10,913,000

Auxiliary Lanes	Required Length of Improvement (km)	Average Unit Cost ($)	Total Cost ($)
Truck Climbing Lane (1)	0.000	1,850,000	0
Truck Climbing Lane (2)	0.000	350,000	0
Passing Lane	0.000	350,000	0
By-pass	0.000		0
Interchange Repair	0.000		0
		Subtotal	0

Rehab Program	Quantity	Average Unit Cost ($)	Total Cost ($)
Asphalt Concrete	2.52 km	200,000	503,200
Structure	1	1,000,000	1,000,000
		Subtotal	1,503,200

Total Cost	$12,420,000

NOTE:
Unit price for surface widening in this segment allows for placement of a 0.8m slug, milling, and resurfacing.

Table 4-6: Segment 11-6 Improvement Strategies & Costs, Existing Alignment

Segment no.: **11-6**
Total Length: **40.73 km**
Description: **Route 11, Bertrand to Janeville**

Geometry	Length of Deficiencies (km)	Required Length of Improvement (km)	Average Unit Cost ($)	Total Cost ($)
Surface widening	23.831	21.487	200,000	4,297,000
Shoulder widening	23.531	0.000	75,000	0
Vertical	1.424	2.529	1,350,000	3,413,000
Horizontal (Minor)	1.273	4.271	750,000	3,203,000
Horizontal (Major)	0.000	0.000	1,500,000	0
			Subtotal	10,913,000

Auxiliary Lanes	Required Length of Improvement (km)	Average Unit Cost ($)	Total Cost ($)
Truck Climbing Lane (1)	0.000	1,850,000	0
Truck Climbing Lane (2)	0.000	350,000	0
Passing Lane	0.000	350,000	0
By-pass	0.000		0
Interchange Repair	0.000		0
		Subtotal	0

Rehab Program	Quantity	Average Unit Cost ($)	Total Cost ($)
Asphalt Concrete	2.52 km	200,000	503,200
Structure	1	1,000,000	1,000,000
		Subtotal	1,503,200

Total Cost	$12,420,000

NOTE:
Unit price for surface widening in this segment allows for placement of a 0.8m slug, milling, and resurfacing.

Table 4-7: Segment 11-7 Improvement Strategies & Costs, Existing Alignment

Segment no.:	**11-7**
Total Length:	**19.87 km**
Description:	**Route 11, Janeville to Bathurst**

Geometry	Length of Deficiencies (km)	Required Length of Improvement (km)	Average Unit Cost ($)	Total Cost ($)
Surface widening	0.000	0.000	200,000	0
Shoulder widening	0.000	0.000	75,000	0
Vertical	0.000	0.000	1,350,000	0
Horizontal (Minor)	0.000	0.000	750,000	0
Horizontal (Major)	0.000	0.000	1,500,000	0
			Subtotal	0

Auxiliary Lanes	Required Length of Improvement (km)	Average Unit Cost ($)	Total Cost ($)
Truck Climbing Lane (1)	0.000	1,850,000	0
Truck Climbing Lane (2)	0.000	350,000	0
Passing Lane	0.000	350,000	0
By-pass	0.000		0
Interchange Repair	0.000		0
		Subtotal	0

Rehab Program	Quantity	Average Unit Cost ($)	Total Cost ($)
Asphalt Concrete	19.87 km	200,000	3,974,000
Structure	0	1,000,000	0
		Subtotal	3,974,000

Total Cost	$3,970,000

Table 4-7: Segment 11-7 Improvement Strategies & Costs, Existing Alignment

Segment no.: **11-7**
Total Length: **19.87 km**
Description: **Route 11, Janeville to Bathurst**

Geometry	Length of Deficiencies (km)	Required Length of Improvement (km)	Average Unit Cost ($)	Total Cost ($)
Surface widening	0.000	0.000	200,000	0
Shoulder widening	0.000	0.000	75,000	0
Vertical	0.000	0.000	1,350,000	0
Horizontal (Minor)	0.000	0.000	750,000	0
Horizontal (Major)	0.000	0.000	1,500,000	0
			Subtotal	0

Auxiliary Lanes	Required Length of Improvement (km)	Average Unit Cost ($)	Total Cost ($)
Truck Climbing Lane (1)	0.000	1,850,000	0
Truck Climbing Lane (2)	0.000	350,000	0
Passing Lane	0.000	350,000	0
By-pass	0.000		0
Interchange Repair	0.000		0
		Subtotal	0

Rehab Program	Quantity	Average Unit Cost ($)	Total Cost ($)
Asphalt Concrete	19.87 km	200,000	3,974,000
Structure	0	1,000,000	0
		Subtotal	3,974,000

Total Cost	$3,970,000

4.1.2 Route 11 – Bathurst to Tide Head

Bathurst to Tide-Head is a relatively new segment of Route 11, built in the late 70's and 80's. This portion of Route 11 is presently posted at 100 km/h. The only point of concern over the entire segment has been the geometric configuration of Route 11 and Route 280 interchange in Eel River Crossing. The possibility of adding a 1.3 km passing lane in the immediate area of Bathurst has also been looked at.

Tables 4-8 to 4-10 show the recommended geometric remediation needed to meet the evaluation standard. The overall remediation length of this section is approximately 2.7 km.The total cost for the required geometric improvements from Bathurst to Tide Head is summarized in Table 4-17.

The Department of Transportation's Highway Bridge and Highway Pavement Rehabilitation program identifies an additional 53.98 km of pavement rehabilitation.

Table 4-8: Segment 11-8 Improvement Strategies & Costs, Existing Alignment

Segment no.: 11-8
Total Length: 41.14 km
Description: Route 11, Bathurst to Belledune

Geometry	Length of Deficiencies (km)	Required Length of Improvement (km)	Average Unit Cost ($)	Total Cost ($)
Surface widening	0.160	0.160	200,000	32,000
Shoulder widening	0.160	0.000	75,000	0
Vertical	0.081	0.200	1,350,000	270,000
Horizontal (Minor)	0.000	0.000	750,000	0
Horizontal (Major)	0.000	0.000	1,500,000	0
			Subtotal	302,000

Auxiliary Lanes	Required Length of Improvement (km)	Average Unit Cost ($)	Total Cost ($)
Truck Climbing Lane (1)	0.000	1,850,000	0
Truck Climbing Lane (2)	0.000	350,000	0
Passing Lane	1.300	350,000	460,000
By-pass	0.000		0
Interchange Repair	0.000		0
		Subtotal	460,000

Rehab Program	Quantity	Average Unit Cost ($)	Total Cost ($)
Asphalt Concrete	9.02 km	200,000	1,803,600
Structure	0	1,000,000	0
		Subtotal	1,803,600

Total Cost	$2,570,000

NOTE:
Unit price for surface widening in this segment allows for placement of a 0.8m slug, milling, and resurfacing.

Table 4-8: Segment 11-8 Improvement Strategies & Costs, Existing Alignment

Segment no.: **11-8**
Total Length: **41.14 km**
Description: **Route 11, Bathurst to Belledune**

Geometry	Length of Deficiencies (km)	Required Length of Improvement (km)	Average Unit Cost ($)	Total Cost ($)
Surface widening	0.160	0.160	200,000	32,000
Shoulder widening	0.160	0.000	75,000	0
Vertical	0.081	0.200	1,350,000	270,000
Horizontal (Minor)	0.000	0.000	750,000	0
Horizontal (Major)	0.000	0.000	1,500,000	0
			Subtotal	302,000

Auxiliary Lanes	Required Length of Improvement (km)	Average Unit Cost ($)	Total Cost ($)
Truck Climbing Lane (1)	0.000	1,850,000	0
Truck Climbing Lane (2)	0.000	350,000	0
Passing Lane	1.300	350,000	460,000
By-pass	0.000		0
Interchange Repair	0.000		0
		Subtotal	460,000

Rehab Program	Quantity	Average Unit Cost ($)	Total Cost ($)
Asphalt Concrete	9.02 km	200,000	1,803,600
Structure	0	1,000,000	0
		Subtotal	1,803,600

Total Cost	$2,570,000

NOTE:
Unit price for surface widening in this segment allows for placement of a 0.8m slug, milling, and resurfacing.

Table 4-9: Segment 11-9 Improvement Strategies & Costs, Existing Alignment

Segment no.:	**11-9**
Total Length:	**31.69 km**
Description:	**Route 11, Belledune to Charlo**

Geometry	Length of Deficiencies (km)	Required Length of Improvement (km)	Average Unit Cost ($)	Total Cost ($)
Surface widening	0.000	0.000	200,000	0
Shoulder widening	0.000	0.000	75,000	0
Vertical	0.000	0.000	1,350,000	0
Horizontal (Minor)	0.000	0.000	750,000	0
Horizontal (Major)	0.000	0.000	1,500,000	0
			Subtotal	0

Auxiliary Lanes	Required Length of Improvement (km)	Average Unit Cost ($)	Total Cost ($)
Truck Climbing Lane (1)	0.000	1,850,000	0
Truck Climbing Lane (2)	0.000	350,000	0
Passing Lane	0.000	350,000	0
By-pass	0.000		0
Interchange Repair	0.000		0
		Subtotal	0

Rehab Program	Quantity	Average Unit Cost ($)	Total Cost ($)
Asphalt Concrete	23.69 km	200,000	4,737,600
Structure	0	1,000,000	0
		Subtotal	4,737,600

Total Cost	$4,740,000

Table 4-9: Segment 11-9 Improvement Strategies & Costs, Existing Alignment

Segment no.:	**11-9**
Total Length:	**31.69 km**
Description:	**Route 11, Belledune to Charlo**

Geometry	Length of Deficiencies (km)	Required Length of Improvement (km)	Average Unit Cost ($)	Total Cost ($)
Surface widening	0.000	0.000	200,000	0
Shoulder widening	0.000	0.000	75,000	0
Vertical	0.000	0.000	1,350,000	0
Horizontal (Minor)	0.000	0.000	750,000	0
Horizontal (Major)	0.000	0.000	1,500,000	0
			Subtotal	0

Auxiliary Lanes	Required Length of Improvement (km)	Average Unit Cost ($)	Total Cost ($)
Truck Climbing Lane (1)	0.000	1,850,000	0
Truck Climbing Lane (2)	0.000	350,000	0
Passing Lane	0.000	350,000	0
By-pass	0.000		0
Interchange Repair	0.000		0
		Subtotal	0

Rehab Program	Quantity	Average Unit Cost ($)	Total Cost ($)
Asphalt Concrete	23.69 km	200,000	4,737,600
Structure	0	1,000,000	0
		Subtotal	4,737,600

Total Cost	$4,740,000

Table 4-10: Segment 11-10 Improvement Strategies & Costs, Existing Alignment

Segment no.:	**11-10**
Total Length:	**44.33 km**
Description:	**Route 11, Charlo to Tide Head**

Geometry	Length of Deficiencies (km)	Required Length of Improvement (km)	Average Unit Cost ($)	Total Cost ($)
Surface widening	0.000	0.000	200,000	0
Shoulder widening	0.000	0.000	75,000	0
Vertical	0.000	0.000	1,350,000	0
Horizontal (Minor)	0.000	0.000	750,000	0
Horizontal (Major)	0.000	0.000	1,500,000	0
			Subtotal	0

Auxiliary Lanes	Required Length of Improvement (km)	Average Unit Cost ($)	Total Cost ($)
Truck Climbing Lane (1)	0.000	1,850,000	0
Truck Climbing Lane (2)	0.000	350,000	0
Passing Lane	0.000	350,000	0
By-pass	0.000		0
Interchange Repair	1.000		750,000
		Subtotal	750,000

Rehab Program	Quantity	Average Unit Cost ($)	Total Cost ($)
Asphalt Concrete	21.27 km	200,000	4,254,799
Structure	0	1,000,000	0
		Subtotal	4,254,799

Total Cost	**$5,000,000**

Table 4-10: Segment 11-10 Improvement Strategies & Costs, Existing Alignment

Segment no.: 11-10

Total Length: 44.33 km

Description: Route 11, Charlo to Tide Head

Geometry	Length of Deficiencies (km)	Required Length of Improvement (km)	Average Unit Cost ($)	Total Cost ($)
Surface widening	0.000	0.000	200,000	0
Shoulder widening	0.000	0.000	75,000	0
Vertical	0.000	0.000	1,350,000	0
Horizontal (Minor)	0.000	0.000	750,000	0
Horizontal (Major)	0.000	0.000	1,500,000	0
			Subtotal	0

Auxiliary Lanes	Required Length of Improvement (km)	Average Unit Cost ($)	Total Cost ($)
Truck Climbing Lane (1)	0.000	1,850,000	0
Truck Climbing Lane (2)	0.000	350,000	0
Passing Lane	0.000	350,000	0
By-pass	0.000		0
Interchange Repair	1.000		750,000
		Subtotal	750,000

Rehab Program	Quantity	Average Unit Cost ($)	Total Cost ($)
Asphalt Concrete	21.27 km	200,000	4,254,799
Structure	0	1,000,000	0
		Subtotal	4,254,799

Total Cost	$5,000,000

4.1.3 Route 17 – Tide Head to Saint Léonard

Route 17 passes through mountainous terrain as it links the municipalities of Kedgwick and Saint-Quentin to the New Brunswick highway network. Some portions of this roadway have been upgraded over the years. The 6-7 km Squaw Cap Diversion, scheduled to open in the near future, will bypass some of the most deficient segments of Route 17.

Other points to be addressed on this highway are segments 17-4 and 17-5, having some of the highest levels of horizontal and vertical alignment deficiencies throughout the study corridor. The need for four (4) climbing lanes within these two (2) segments has been identified.

As in the case of the Tracadie-Sheila Bypass, the remaining cost to complete the Squaw Cap Diversion has been included in this study. The cost for remediation along the portion of Route 17 bypassed by the Squaw Cap Diversion, has been removed from the overall cost.

The total remediation length of this section is 117 km with over 32% relating to alignment issues. Tables 4-11 through 4-15 identify the improvement costs per segment, whereas, the upgrading cost for Route 17, from Tide Head to Saint-Léonard is shown in Table 4-17.

The Department of Transportation's Highway Bridge and Highway Pavement Rehabilitation program identifies an additional 18.2 km of pavement rehabilitation.

Table 4-11: Segment 17-1 Improvement Strategies & Costs, Existing Alignment and Bypass

Segment no.:	**17-1**
Total Length:	**21.03 km**
Description:	**Route 17, Tide Head to Robinsonville**

Geometry	Length of Deficiencies (km)	Required Length of Improvement (km)	Average Unit Cost ($)	Total Cost ($)
Surface widening	8.538	3.328	200,000	666,000
Shoulder widening	8.538	0.000	75,000	0
Vertical	3.009	0.000	1,350,000	0
Horizontal (Minor)	3.114	2.400	750,000	1,800,000
Horizontal (Major)	0.131	0.139	1,500,000	207,750
			Subtotal	2,673,750

Auxiliary Lanes	Required Length of Improvement (km)	Average Unit Cost ($)	Total Cost ($)
Truck Climbing Lane (1)	0.000	1,850,000	0
Truck Climbing Lane (2)	0.000	350,000	0
Passing Lane	0.000	350,000	0
By-pass	Squaw Cap By-Pass		6,500,000
Interchange Repair	0.000		0
		Subtotal	6,500,000

Rehab Program	Quantity	Average Unit Cost ($)	Total Cost ($)
Asphalt Concrete	10.02 km	200,000	2,003,600
Structure	2	1,250,000	2,500,000
		Subtotal	4,503,600

Total Cost	**$13,680,000**

NOTES:

* The 6 km Squaw Cap Diversion is currently under construction. The estimated cost to complete this diversion is approximately **$6.5 Million**.

This new section of Route 17 will bypass an area of the existing Route 17 that has a high level of geometric deficiencies.

Table 4-11: Segment 17-1 Improvement Strategies & Costs, Existing Alignment and Bypass

Segment no.:	**17-1**
Total Length:	**21.03 km**
Description:	**Route 17, Tide Head to Robinsonville**

Geometry	Length of Deficiencies (km)	Required Length of Improvement (km)	Average Unit Cost ($)	Total Cost ($)
Surface widening	8.538	3.328	200,000	666,000
Shoulder widening	8.538	0.000	75,000	0
Vertical	3.009	0.000	1,350,000	0
Horizontal (Minor)	3.114	2.400	750,000	1,800,000
Horizontal (Major)	0.131	0.139	1,500,000	207,750
			Subtotal	2,673,750

Auxiliary Lanes	Required Length of Improvement (km)	Average Unit Cost ($)	Total Cost ($)
Truck Climbing Lane (1)	0.000	1,850,000	0
Truck Climbing Lane (2)	0.000	350,000	0
Passing Lane	0.000	350,000	0
By-pass	Squaw Cap By-Pass		6,500,000
Interchange Repair	0.000		0
		Subtotal	6,500,000

Rehab Program	Quantity	Average Unit Cost ($)	Total Cost ($)
Asphalt Concrete	10.02 km	200,000	2,003,600
Structure	2	1,250,000	2,500,000
		Subtotal	4,503,600

Total Cost	$13,680,000

NOTES:

* The 6 km Squaw Cap Diversion is currently under construction. The estimated cost to complete this diversion is approximately **$6.5 Million**.

This new section of Route 17 will bypass an area of the existing Route 17 that has a high level of geometric deficiencies.

Table 4-12: Segment 17-2 Improvement Strategies & Costs, Existing Alignment

Segment no.: 17-2
Total Length: 38.21 km
Description: Route 17, Robinsonville to Whites Brook

Geometry	Length of Deficiencies (km)	Required Length of Improvement (km)	Average Unit Cost ($)	Total Cost ($)
Surface widening	15.979	13.512	200,000	2,702,000
Shoulder widening	2.669	0.000	75,000	0
Vertical	4.225	4.814	1,350,000	6,498,000
Horizontal (Minor)	0.723	0.797	750,000	598,000
Horizontal (Major)	0.948	1.120	1,500,000	1,679,625
			Subtotal	11,477,625

Auxiliary Lanes	Required Length of Improvement (km)	Average Unit Cost ($)	Total Cost ($)
Truck Climbing Lane (1)	0.000	1,850,000	0
Truck Climbing Lane (2)	0.000	350,000	0
Passing Lane	0.000	350,000	0
By-pass	0.000		0
Interchange Repair	0.000		0
		Subtotal	0

Rehab Program	Quantity	Average Unit Cost ($)	Total Cost ($)
Asphalt Concrete	2.95 km	200,000	589,200
Structure	1	1,000,000	1,000,000
		Subtotal	1,589,200

Total Cost	$13,070,000

NOTES:
Unit price for surface widening in this segment allows for placement of a 0.8m slug, milling, and resurfacing.

Table 4-12: Segment 17-2 Improvement Strategies & Costs, Existing Alignment

Segment no.:	**17-2**
Total Length:	**38.21 km**
Description:	**Route 17, Robinsonville to Whites Brook**

Geometry	Length of Deficiencies (km)	Required Length of Improvement (km)	Average Unit Cost ($)	Total Cost ($)
Surface widening	15.979	13.512	200,000	2,702,000
Shoulder widening	2.669	0.000	75,000	0
Vertical	4.225	4.814	1,350,000	6,498,000
Horizontal (Minor)	0.723	0.797	750,000	598,000
Horizontal (Major)	0.948	1.120	1,500,000	1,679,625
			Subtotal	11,477,625

Auxiliary Lanes	Required Length of Improvement (km)	Average Unit Cost ($)	Total Cost ($)
Truck Climbing Lane (1)	0.000	1,850,000	0
Truck Climbing Lane (2)	0.000	350,000	0
Passing Lane	0.000	350,000	0
By-pass	0.000		0
Interchange Repair	0.000		0
		Subtotal	0

Rehab Program	Quantity	Average Unit Cost ($)	Total Cost ($)
Asphalt Concrete	2.95 km	200,000	589,200
Structure	1	1,000,000	1,000,000
		Subtotal	1,589,200

Total Cost	$13,070,000

NOTES:
Unit price for surface widening in this segment allows for placement of a 0.8m slug, milling, and resurfacing.

Table 4-13: Segment 17-3 Improvement Strategies & Costs, Existing Alignment

Segment no.:	**17-3**
Total Length:	**31.27 km**
Description:	**Route 17, Whites Brook to Restigouche County Line**

Geometry	Length of Deficiencies (km)	Required Length of Improvement (km)	Average Unit Cost ($)	Total Cost ($)
Surface widening	23.270	22.305	200,000	4,461,000
Shoulder widening	10.434	0.000	75,000	0
Vertical	0.580	1.200	1,350,000	1,620,000
Horizontal (Minor)	0.000	0.000	750,000	0
Horizontal (Major)	0.104	0.178	1,500,000	267,000
			Subtotal	6,348,000

Auxiliary Lanes	Required Length of Improvement (km)	Average Unit Cost ($)	Total Cost ($)
Truck Climbing Lane (1)	0.000	1,850,000	0
Truck Climbing Lane (2)	0.000	350,000	0
Passing Lane	0.000	350,000	0
By-pass	0.000		0
Interchange Repair	0.000		0
		Subtotal	0

Rehab Program	Quantity	Average Unit Cost ($)	Total Cost ($)
Asphalt Concrete	4.47 km	200,000	893,000
Structure	1	1,000,000	1,000,000
		Subtotal	1,893,000

Total Cost	$8,240,000

NOTES:
Unit price for surface widening in this segment allows for placement of a 0.8m slug, milling, and resurfacing.

Table 4-13: Segment 17-3 Improvement Strategies & Costs, Existing Alignment

Segment no.: **17-3**

Total Length: **31.27 km**

Description: **Route 17, Whites Brook to Restigouche County Line**

Geometry	Length of Deficiencies (km)	Required Length of Improvement (km)	Average Unit Cost ($)	Total Cost ($)
Surface widening	23.270	22.305	200,000	4,461,000
Shoulder widening	10.434	0.000	75,000	0
Vertical	0.580	1.200	1,350,000	1,620,000
Horizontal (Minor)	0.000	0.000	750,000	0
Horizontal (Major)	0.104	0.178	1,500,000	267,000
			Subtotal	6,348,000

Auxiliary Lanes	Required Length of Improvement (km)	Average Unit Cost ($)	Total Cost ($)
Truck Climbing Lane (1)	0.000	1,850,000	0
Truck Climbing Lane (2)	0.000	350,000	0
Passing Lane	0.000	350,000	0
By-pass	0.000		0
Interchange Repair	0.000		0
		Subtotal	0

Rehab Program	Quantity	Average Unit Cost ($)	Total Cost ($)
Asphalt Concrete	4.47 km	200,000	893,000
Structure	1	1,000,000	1,000,000
		Subtotal	1,893,000

Total Cost	$8,240,000

NOTES:
Unit price for surface widening in this segment allows for placement of a 0.8m slug, milling, and resurfacing.

Table 4-14: Segment 17-4 Improvement Strategies & Costs, Existing Alignment

Segment no.: **17-4**
Total Length: **32.66 km**
Description: **Route 17, Restigouche/Victoria County Line to Victoria/Madawaska County Line**

Geometry	Length of Deficiencies (km)	Required Length of Improvement (km)	Average Unit Cost ($)	Total Cost ($)
Surface widening	25.158	13.969	200,000	2,794,000
Shoulder widening	0.000	0.000	75,000	0
Vertical	6.584	6.982	1,350,000	9,426,000
Horizontal (Minor)	1.215	1.762	750,000	1,322,000
Horizontal (Major)	0.583	0.740	1,500,000	1,110,750
			Subtotal	14,652,750

Auxiliary Lanes	Required Length of Improvement (km)	Average Unit Cost ($)	Total Cost ($)
Truck Climbing Lane (1)	2.950	1,850,000	5,458,000
Truck Climbing Lane (2)	11.650	350,000	4,078,000
Passing Lane	0.000	350,000	0
By-pass	0.000		0
Interchange Repair	0.000		0
		Subtotal	9,536,000

Rehab Program	Quantity	Average Unit Cost ($)	Total Cost ($)
Asphalt Concrete	0.10 km	200,000	20,000
Structure	1	1,000,000	1,000,000
		Subtotal	1,020,000

Total Cost	$25,210,000

NOTES:
In this segment, one (1) truck climbing lane is presently in the design phase (Black Brook).

Table 4-14: Segment 17-4 Improvement Strategies & Costs, Existing Alignment

Segment no.:	**17-4**
Total Length:	**32.66 km**
Description:	**Route 17, Restigouche/Victoria County Line to Victoria/Madawaska County Line**

Geometry	Length of Deficiencies (km)	Required Length of Improvement (km)	Average Unit Cost ($)	Total Cost ($)
Surface widening	25.158	13.969	200,000	2,794,000
Shoulder widening	0.000	0.000	75,000	0
Vertical	6.584	6.982	1,350,000	9,426,000
Horizontal (Minor)	1.215	1.762	750,000	1,322,000
Horizontal (Major)	0.583	0.740	1,500,000	1,110,750
			Subtotal	14,652,750

Auxiliary Lanes	Required Length of Improvement (km)	Average Unit Cost ($)	Total Cost ($)
Truck Climbing Lane (1)	2.950	1,850,000	5,458,000
Truck Climbing Lane (2)	11.650	350,000	4,078,000
Passing Lane	0.000	350,000	0
By-pass	0.000		0
Interchange Repair	0.000		0
		Subtotal	9,536,000

Rehab Program	Quantity	Average Unit Cost ($)	Total Cost ($)
Asphalt Concrete	0.10 km	200,000	20,000
Structure	1	1,000,000	1,000,000
		Subtotal	1,020,000

Total Cost	$25,210,000

NOTES:
In this segment, one (1) truck climbing lane is presently in the design phase (Black Brook).

Table 4-15: Segment 17-5 Improvement Strategies & Costs, Existing Alignment

Segment no.: **17-5**
Total Length: **24.69 km**
Description: **Route 17, Victoria / Madawaska County Line to Saint-Léonard**

Geometry	Length of Deficiencies (km)	Required Length of Improvement (km)	Average Unit Cost ($)	Total Cost ($)
Surface widening	11.109	3.483	200,000	697,000
Shoulder widening	14.330	4.341	75,000	326,000
Vertical	4.953	5.278	1,350,000	7,125,000
Horizontal (Minor)	0.957	2.179	750,000	1,634,000
Horizontal (Major)			1,500,000	0
			Subtotal	9,782,000

Auxiliary Lanes	Required Length of Improvement (km)	Average Unit Cost ($)	Total Cost ($)
Truck Climbing Lane (1)	7.463	1,850,000	13,806,000
Truck Climbing Lane (2)	6.938	350,000	2,428,000
Passing Lane	0.000	350,000	0
By-pass	0.000		0
Interchange Repair	0.000		0
		Subtotal	16,234,000

Rehab Program	Quantity	Average Unit Cost ($)	Total Cost ($)
Asphalt Concrete	0.70 km	200,000	140,000
Structure	1	1,000,000	1,000,000
		Subtotal	1,140,000

Total Cost	$27,160,000

NOTES:
In this segment, one (1) truck climbing lane is presently in the design phase (Big Forks).

Unit price for surface widening in this segment allows for placement of a 0.8m slug, milling, and resurfacing.

Table 4-15: Segment 17-5 Improvement Strategies & Costs, Existing Alignment

Segment no.: **17-5**
Total Length: **24.69 km**
Description: **Route 17, Victoria / Madawaska County Line to Saint-Léonard**

Geometry	Length of Deficiencies (km)	Required Length of Improvement (km)	Average Unit Cost ($)	Total Cost ($)
Surface widening	11.109	3.483	200,000	697,000
Shoulder widening	14.330	4.341	75,000	326,000
Vertical	4.953	5.278	1,350,000	7,125,000
Horizontal (Minor)	0.957	2.179	750,000	1,634,000
Horizontal (Major)			1,500,000	0
			Subtotal	9,782,000

Auxiliary Lanes	Required Length of Improvement (km)	Average Unit Cost ($)	Total Cost ($)
Truck Climbing Lane (1)	7.463	1,850,000	13,806,000
Truck Climbing Lane (2)	6.938	350,000	2,428,000
Passing Lane	0.000	350,000	0
By-pass	0.000		0
Interchange Repair	0.000		0
		Subtotal	16,234,000

Rehab Program	Quantity	Average Unit Cost ($)	Total Cost ($)
Asphalt Concrete	0.70 km	200,000	140,000
Structure	1	1,000,000	1,000,000
		Subtotal	1,140,000

Total Cost	$27,160,000

NOTES:
In this segment, one (1) truck climbing lane is presently in the design phase (Big Forks).

Unit price for surface widening in this segment allows for placement of a 0.8m slug, milling, and resurfacing.

4.1.4 Cost of Improvements to Existing Highway Alignment

The improvement costs calculated in Tables 4-1 to 4-15 indicate only the amounts that are required to bring the existing highway alignment to an acceptable standard. Table 4-16 is a summary of the 15 segments showing the improvement costs along with overall ranking.

The Bathurst to Tide Head portion of Route 11 was built to alleviate problem areas that are still found in the other two (2) sections within the study corridor. This observation is evident in the overall cost report where only minimal funds are required to improve the Bathurst to Tide Head highway section as seen in Table 4-17.

The following Chapters 4.2 and 4.3 address other improvement strategies that should be considered when planning the upgrade of Route 11 and Route 17.

Table 4-16
Remediation Cost Summary

ROUTE 11 AND ROUTE 17 NEEDS STUDY				
Segment				
Number	**Description**	**Total Length (km)**	**RANK**	**Remediation Cost ($)**
11-1	Miramichi to Burnt Church	31.17	11	5,530,000
11-2	Burnt Church to Tracadie-Sheila	34.61	9	7,070,000
11-3	Tracadie-Sheila area (County Line to Route 160)	14.87	2	7,940,000
11-4	Route 160 to Blanchard Road	20.88	6	6,240,000
11-5	Blanchard Road to Bertrand	16.29	1	1,290,000
11-6	Bertrand to Janeville	40.73	5	12,420,000
11-7	Janeville to Bathurst	19.87	15	3,970,000
11-8	Bathurst to Belledune	41.14	12	2,570,000
11-9	Belledune to Charlo	31.69	14	4,740,000
11-10	Charlo to Tide Head	44.33	13	5,000,000
17-1	Tide Head to Robinsonville	21.03	10	13,680,000
17-2	Robinsonville to Whites Brook	38.21	7	13,070,000
17-3	Whites Brook to Restigouche County Line	31.27	3	8,240,000
17-4	Restigouche / Victoria County Line to Victoria / Madawaska County Line	32.66	8	25,210,000
17-5	Victoria / Madawaska County Line to Saint-Léonard	24.69	4	27,160,000
	Total Cost	**443.42**		**144,130,000**

Note: Ranking indicates segment of worst (Rank 1) to best condition (Rank 15).

Table 4-16
Remediation Cost Summary

ROUTE 11 AND ROUTE 17 NEEDS STUDY				
Segment				
Number	Description	Total Length (km)	RANK	Remediation Cost ($)
11-1	Miramichi to Burnt Church	31.17	11	5,530,000
11-2	Burnt Church to Tracadie-Sheila	34.61	9	7,070,000
11-3	Tracadie-Sheila area (County Line to Route 160)	14.87	2	7,940,000
11-4	Route 160 to Blanchard Road	20.88	6	6,240,000
11-5	Blanchard Road to Bertrand	16.29	1	1,290,000
11-6	Bertrand to Janeville	40.73	5	12,420,000
11-7	Janeville to Bathurst	19.87	15	3,970,000
11-8	Bathurst to Belledune	41.14	12	2,570,000
11-9	Belledune to Charlo	31.69	14	4,740,000
11-10	Charlo to Tide Head	44.33	13	5,000,000
17-1	Tide Head to Robinsonville	21.03	10	13,680,000
17-2	Robinsonville to Whites Brook	38.21	7	13,070,000
17-3	Whites Brook to Restigouche County Line	31.27	3	8,240,000
17-4	Restigouche / Victoria County Line to Victoria / Madawaska County Line	32.66	8	25,210,000
17-5	Victoria / Madawaska County Line to Saint-Léonard	24.69	4	27,160,000
	Total Cost	**443.42**		**144,130,000**

Note: Ranking indicates segment of worst (Rank 1) to best condition (Rank 15).

4.2 Potential for New Highway Alignments

As outlined in Section 4.1, the improvement strategies for the existing highway alignment were based on correcting current geometric deficiencies in order to meet RAU 90 highway standards and improve highway safety and service. However, there remains a number of highway segments within the study area where upgrading the geometric parameters will not achieve any significant improvement in the average posted speed, due primarily to the degree of adjacent roadside development.

In these areas, the only long term solution may involve a completely new highway alignment design or the bypassing of sections within the segment where the posted speed is of particular concern. These areas will require further study.

The identification of areas for potential new highway alignments can best be determined by reviewing the results of Section 3.5 dealing with average posted speed. Table 3-6 indicates that five (5) of the 15 highway segments studied currently have an average posted speed of 90 km/h or greater. Another six (6) highway segments have an average posted speed between 80 and 89 km/h, with the worst of these segments, the Tide Head to Robinsonville section of Route 17, being addressed by a new highway alignment currently under construction. Proposed improvements to current geometric deficiencies in the rural areas of the other five (5) segments should also result in some improvements to the overall travel time. In consideration of the high cost and potential social impact of developing new highway alignments, it can be argued that the feasibility of pursuing a bypass solution for these particular highway segments may be difficult to justify.

This leaves the following four (4) highway segments where the current average posted speed is under 80 km/h.

4.2.1 Segment 11-3, Tracadie-Sheila Area

The actual average posted speed for this segment is 67.2 km/h. However, a complete bypass of the Tracadie-Sheila area is currently under construction and will be opening to traffic in the fall of 2003. The Tracadie-Sheila Bypass, with a posted speed of 100km/h, will alleviate any current deficiencies in travel time.

4.2.2 Segment 11-5, Blanchard Road to Bertrand

The current average posted speed for this segment is 68.1 km/h, largely due to the extended boundaries of the municipality of Caraquet. Consideration should therefore be given to developing a new highway alignment to bypass this entire highway segment (16.3 km) in the future. A further study is required to determine the best routing for such a potential new alignment and the degree of community support for such an undertaking. Based on an order-of-magnitude of approximately $2.0 to $2.25 million/km for a new two (2) lane controlled access highway alignment, such a bypass would cost in the vicinity of $30 to $40 million to develop.

4.2.3 Segment 11-2, Burnt Church to Tracadie-Sheila

The current average posted speed for this segment is 74.8 km/h as a result of the current alignment passing through a number of smaller communities and local service districts such as Tabusintac, Rivière-du-Portage, and Brantville.

This highway segment (34.6 km) should be further studied to assess whether some of the areas with lower posted speeds should be bypassed. Similar to highway segment 11-5, such a study would determine the best routing for any potential bypass(es) within this segment, along with determining the degree of community support for such an undertaking.

It is not possible at this stage to firmly estimate the potential cost of any new highway alignments within this segment, but it could be in the range of $20 to $80 million.

4.2.4 Segment 17-3, Whites Brook to Restigouche County Line

This highway segment (31.2 km) has an average posted speed of 78.5 km/h. The segment remains largely rural in nature and sparsely populated with the exception of where the routing runs through the two (2) communities of Kedgwick and Saint Quentin. These are the only two communities of significant size along the entire segment of Route 17 under study. It is recommended that the proposed improvements to the current geometric deficiencies in the rural areas of this segment be addressed as an initial phase for improving this highway segment. The resulting improvements in average posted speed and travel time should then be assessed before consideration is given to studying any potential for new highway alignments in this area.

4.3 Other Improvement Strategies

The improvement strategies under this category are not warranted by the geometric deficiencies of the current highway alignments but are considered to be potential strategies for improving the four (4) remaining evaluation criteria.

Other improvement strategies that could be addressed but have not been fully investigated in this report are as follows:

- Introduction of boulevards in certain localities in order to streamline traffic flow;
- Re-aligning intersection to re-establish through traffic on major road. This is presently occurring in the villages of Bertrand and Kedgwick;
- Lengthening of existing acceleration and deceleration lanes in order to meet minimum posted speed of 100km/h;
- Improving intersections within urban areas. A prime example of present work being performed regarding this is the Route 17 and Route 180 intersection in the Town of Saint-Quentin;
- Improving safety at interchanges, such as increasing sight distances, improving lighting, ..etc;
- Maitenance of brush cutting activities to improve sight lines, especially in areas of large moose population.

4.4 Total Cost of Improvements

The following Table 4-17 outlines the total cost of improvements which includes the remediation of the existing alignment and the development of the bypasses for Burnt Church to Tracadie-Sheila (Segment 11-2) and Blanchard Road to Bertand (Segment 11-5).

Table 4-17: Total Cost of Improvements

Sector no.:	**1 Route 11**	
Total Length:	**178.4 km**	
Description:	**Segments 11-1 to 11-7, from Miramichi to Bathurst**	
Estimated Cost:	**$44,460,000**	**(Existing Alignment)**
	$50 to $120 million	**(Potential Bypasses)**

Sector no.:	**2 Route 11**	
Total Length:	**117.2 km**	
Description:	**Segments 11-8 to 11-10, from Bathurst to Tide-Head**	
Estimated Cost:	**$12,310,000**	**(Existing Alignment)**

Sector no.:	**3 Route 17**	
Total Length:	**147.9 km**	
Description:	**Segments 17-1 to 17-5, from Tide-Head to Saint-Léonard**	
Estimated Cost:	**$87,360,000**	**(Existing Alignment)**

Total Cost of Improvements	**$195 to $265 million**

APPENDICES

APPENDIX A - NBDOT Terms of Reference

APPENDIX B - Access Control Levels

APPENDIX C - Typical Cross Sections

APPENDIX D - Sensitivity Analysis

APPENDIX A

NBDOT TERMS OF REFERENCE

TERMS OF REFERENCE

UPGRADING STRATEGIES AND ESTIMATED COSTS
ROUTE 11 AND ROUTE 17
MIRAMICHI TO SAINT-LÉONARD

Project Purpose

The purpose of this project is to identify improvement strategies for Route 11 between Miramichi (north end of Centennial Bridge) and Tidehead (junction of Route 17) and Route 17 between Tidehead (junction of Route 11) and Saint-Léonard (interchange with Route 2)

The focus of the study is to review the conditions within the existing highway corridor, recommend improvement strategies and estimate the cost to achieve the identified improvements. The goal is to achieve an upgraded roadway that meets present day standards for an arterial class highway with a minimum posted speed of 90 km/h in rural areas and 50 km/h in urban areas.

Approach

The study area has been divided into fifteen (15) highway segments as shown on attachment 'A'.

Each highway segment will be analyzed with respect to five (5) evaluation criteria. The five (5) evaluation criteria and relative parameters are as follows:

CRITERIA	PARAMETER
Safety	Accident Rate
Service	Passing Opportunities
Economic	Traffic Volumes
Geometric	Surface / Shoulder Width
Travel Time	Posted Speed

All highway segments will be ranked according to each individual criteria and an overall ranking, based on a weighted average of all five (5) criteria, will be developed.

Highway improvement options will be identified for each highway segment, further broken down into appropriate subsections.

These will include, but not be limited to:

1. Safety Improvements	Rehabilitation of segments of roadways where cross-sectional elements as well as horizontal and vertical elements are substandard.
2. Service Improvements	Identification of areas where passing lanes and climbing lanes can be incorporated into the roadway.
3. Other	Any other improvements identified that could enhance safety or improve the efficiency of delivery of goods will also be noted. Areas where future bypasses should be considered will also be identified.

An estimate of the cost for identified improvement strategies will be determined for each highway segment and subsection.

Result

The resulting report will identify the areas and segments of greatest deficiency, proposed improvement strategies and the cost to achieve those improvements. This report will be used as a guide for the Province of New Brunswick to effectively allocate resources to the upgrading of Routes 11 and 17.

ATTACHMENT 'A'

ROUTE 11 AND ROUTE 17
MIRAMICHI TO SAINT-LÉONARD

EVALUATION SEGMENTS

11-1	Miramichi to Burnt Church	31.166 km
11-2	Burnt Church to Tracadie-Sheila	34.605 km
11-3	Tracadie-Sheila area (County Line to Route 160)	14.878 km
11-4	Route 160 to Blanchard Road	20.880 km
11-5	Blanchard Road to Bertrand	16.288 km
11-6	Bertrand to Janeville	40.727 km
11-7	Janeville to Bathurst	19.870 km
11-8	Bathurst to Belledune	41.140 km
11-9	Belledune to Charlo	31.688 km
11-10	Charlo to Tide Head	44.327 km
Total Route 11		295.569 km
17-1	Tide Head to Robinsonville	21.028 km
17-2	Robinsonville to Whites Brook	37.944 km
17-3	Whites Brook to Restigouche County Line	31.273 km
17-4	Restigouche / Victoria County Line to Victoria / Madawaska County Line	32.658 km
17-5	Victoria / Madawaska County to Saint- Léonard	24.68 km
Total Route 17		147.589 km
Total Route 11 and Route 17		443.158 km

APPENDIX B

ACCESS CONTROL LEVELS

RESPONSIBILITIES FOR APPROVALS OF ACCESS PERMITS

Level of access control	Ministerial authority	Cabinet authority
I	construction access	emergency access utility access
II	construction access agricultural and/or natural resource access	emergency access utility access
III	construction access agricultural and/or natural resource access municipal road or street access	emergency access utility access
IV	construction access agricultural and/or natural resource access municipal road or street access emergency access utility access	access for any purpose other than those allowed by the Minister

Definition of terms:

Emergency Accesses are intended for cases similar to the existing access allowed to the Moncton airport off Route 15. The access permitted at this location has a breakaway gate that is designed to collapse when pushed by emergency vehicles.

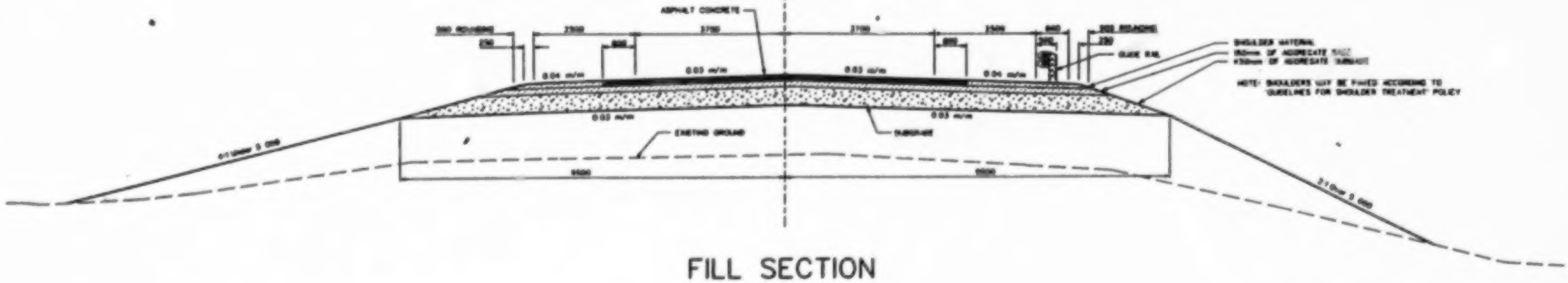
Utility Accesses are for the purpose of site inspection and for maintenance activities performed within a short period of time. In the case of NB Power and NB Tel this could be to visit a facility and make visual inspection of transformers, switching equipment, etc., or for cases such as an irrigation dam at the Tantramar River that needs to be inspected from time to time. There may also be uses for municipalities for short visits to pumping stations, water treatment facilities or the like.

Temporary Construction Access will only be permitted within construction zones and will be considered only in the case where there would be significant savings realized by the Province. Such permits could also be granted to an agent of the Province or to a provincial Crown corporation. For example, access could be permitted to NB Power during the construction of a tower in a remote area. In the case of highway construction, access could be for construction materials located off the highway right-of-way.

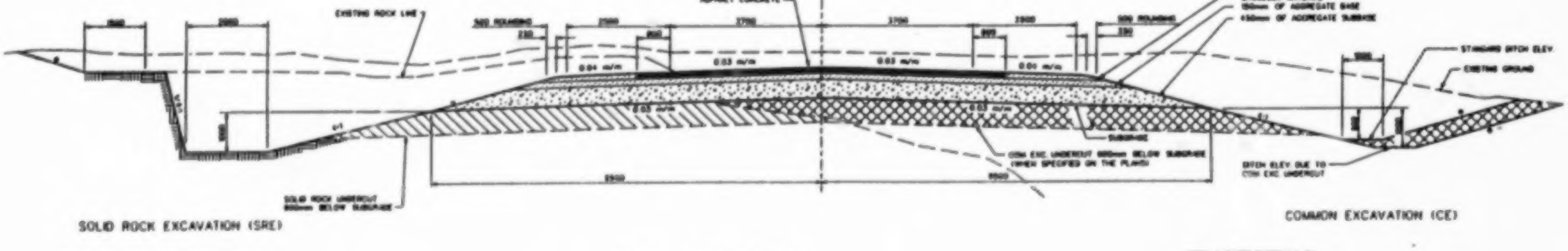
APPENDIX C

TYPICAL CROSS SECTIONS

RAU 90


ASPHALT CONCRETE
500 ROUNDING
230
2500
800
3700
3700
800
2500
840
300 ROUNDING
230
GUIDE RAIL
0.04 m/m
0.03 m/m
0.03 m/m
0.04 m/m
0.03 m/m
0.03 m/m
EXISTING GROUND
SUBGRADE
SHOULDER MATERIAL
150mm OF AGGREGATE BASE
450mm OF AGGREGATE SUBBASE
NOTE: SHOULDERS MAY BE PAVED ACCORDING TO "GUIDELINES FOR SHOULDER TREATMENT" POLICY

FILL SECTION


1500
2000
EXISTING ROCK LINE
500 ROUNDING
230
2500
800
3700
3700
800
2500
500 ROUNDING
230
ASPHALT CONCRETE
0.04 m/m
0.03 m/m
0.03 m/m
0.04 m/m
SHOULDER MATERIAL
150mm OF AGGREGATE BASE
450mm OF AGGREGATE SUBBASE
STANDARD DITCH ELEV
EXISTING GROUND
SUBGRADE
COM EXC UNDERCUT 600mm BELOW SUBGRADE (WHEN SPECIFIED ON THE PLANS)
DITCH ELEV DUE TO COM EXC UNDERCUT
SOLID ROCK UNDERCUT 600mm BELOW SUBGRADE
SOLID ROCK EXCAVATION (SRE)
NOTE: DITCH WIDTH TO BE 2000 WHEN DEPTH OF SOLID ROCK CUT IS GREATER THAN 10 metres
COMMON EXCAVATION (CE)
NOTE: B SLOPE TYPICALLY 3:1

CUT SECTION

THE BASIC UNIT OF DIMENSIONING IS MILLIMETRES

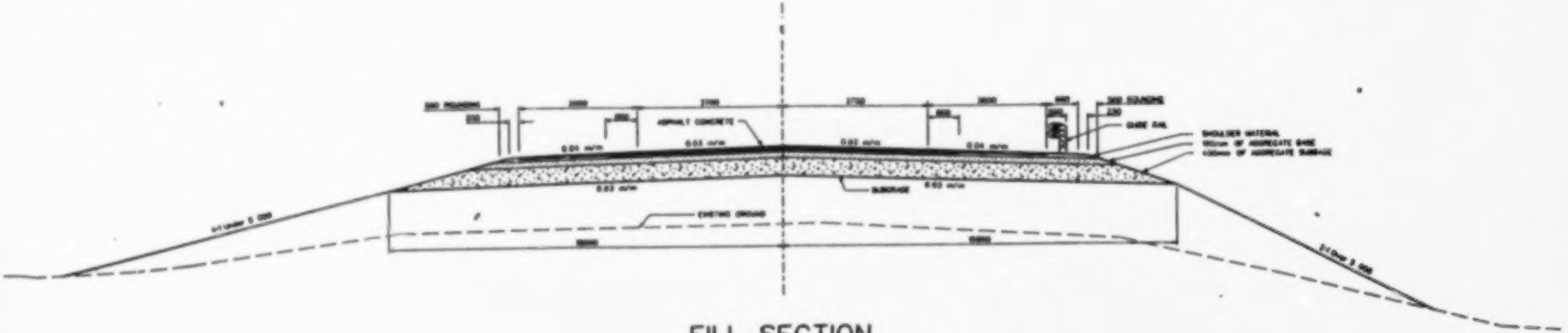
MARK	REVISIONS	DATE
	REVISED	03/07/18

DEPARTMENT OF TRANSPORTATION
PROVINCE OF NEW BRUNSWICK
DESIGN BRANCH
FREDERICTON

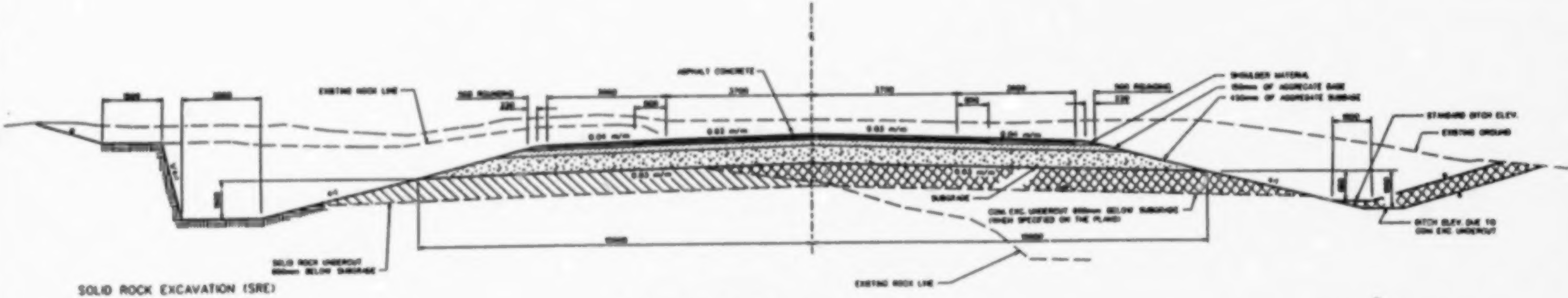
TYPICAL SECTIONS
NOT TO SCALE

DWG. No. 13 OF 20

RAU 100


500 ROUNDING
2700
2700
ASPHALT CONCRETE
0.04 m/m
0.03 m/m
0.03 m/m
0.04 m/m
GUIDE RAIL
SHOULDER MATERIAL
150mm OF AGGREGATE BASE
450mm OF AGGREGATE SUBBASE
SUBGRADE
EXISTING GROUND

FILL SECTION


EXISTING ROCK LINE
500 ROUNDING
ASPHALT CONCRETE
2700
2700
0.04 m/m
0.03 m/m
0.03 m/m
0.04 m/m
SHOULDER MATERIAL
150mm OF AGGREGATE BASE
450mm OF AGGREGATE SUBBASE
STANDARD DITCH ELEV.
EXISTING GROUND
SUBGRADE
CON. EXC. UNDERCUT 600mm BELOW SUBGRADE (WHEN SPECIFIED ON THE PLANS)
DITCH ELEV. DUE TO CON. EXC. UNDERCUT
SOLID ROCK UNDERCUT 600mm BELOW SUBGRADE
EXISTING ROCK LINE

SOLID ROCK EXCAVATION (SRE)

NOTE: DITCH WIDTH TO BE 3 000 WHEN DEPTH OF SOLID ROCK CUT IS GREATER THAN 10 metres.

CUT SECTION

COMMON EXCAVATION (CE)

NOTE: ✱ SLOPE TYPICALLY 3:1

THE BASIC UNIT OF DIMENSIONING IS MILLIMETRES

	REVISED	03/07/18
MARK	REVISIONS	DATE

DEPARTMENT OF TRANSPORTATION
PROVINCE OF NEW BRUNSWICK
DESIGN BRANCH
FREDERICTON

TYPICAL SECTIONS
NOT TO SCALE

DWG. No. 12 OF 20

APPENDIX D

SENSITIVITY ANALYSIS

Table 3-8
Overall Ranking By Segment
"A"

ROUTE 11 AND ROUTE 17 NEEDS STUDY								
Segment			OVERALL RANKING					
Number	Description	Total Length (km)	Collision Rate (30%)	Passing Restrictions (15%)	Traffic Volumes (10%)	Geometric Deficiencies (30%)	Posted Speed (15%)	OVERALL RANKING
11-1	Miramichi to Burnt Church	31.17	9	15	4	11	10	11
11-2	Burnt Church to Tracadie-Sheila	34.61	4	14	7	9	3	9
11-3	Tracadie-Sheila area (County Line to Route 160)	14.87	1	6	1	10	1	2
11-4	Route 160 to Blanchard Road	20.88	5	11	6	7	6	6
11-5	Blanchard Road to Bertrand	16.29	2	4	2	8	2	1
11-6	Bertrand to Janeville	40.73	6	10	11	4	7	5
11-7	Janeville to Bathurst	19.87	15	13	13	14	12	15
11-8	Bathurst to Belledune	41.14	11	7	3	13	13	12
11-9	Belledune to Charlo	31.69	14	12	8	14	15	14
11-10	Charlo to Tide Head	44.33	12	8	5	12	14	13
17-1	Tide Head to Robinsonville	21.03	13	2	10	6	5	10
17-2	Robinsonville to Whites Brook	38.21	7	5	15	5	8	7
17-3	Whites Brook to Restigouche County Line	31.27	3	9	9	3	4	3
17-4	Restigouche / Victoria County Line to Victoria / Madawaska County Line	32.66	10	3	14	2	11	8
17-5	Victoria / Madawaska County Line to Saint-Léonard	24.69	8	1	12	1	9	4

Note: Ranking indicates segment of worst (Rank 1) to best condition (Rank 15).

Table 3-8
Overall Ranking By Segment
"A"

ROUTE 11 AND ROUTE 17 NEEDS STUDY								
Segment			OVERALL RANKING					
Number	Description	Total Length (km)	Collision Rate (30%)	Passing Restrictions (15%)	Traffic Volumes (10%)	Geometric Deficiencies (30%)	Posted Speed (15%)	OVERALL RANKING
11-1	Miramichi to Burnt Church	31.17	9	15	4	11	10	**11**
11-2	Burnt Church to Tracadie-Sheila	34.61	4	14	7	9	3	**9**
11-3	Tracadie-Sheila area (County Line to Route 160)	14.87	1	6	1	10	1	**2**
11-4	Route 160 to Blanchard Road	20.88	5	11	6	7	6	**6**
11-5	Blanchard Road to Bertrand	16.29	2	4	2	8	2	**1**
11-6	Bertrand to Janeville	40.73	6	10	11	4	7	**5**
11-7	Janeville to Bathurst	19.87	15	13	13	14	12	**15**
11-8	Bathurst to Belledune	41.14	11	7	3	13	13	**12**
11-9	Belledune to Charlo	31.69	14	12	8	14	15	**14**
11-10	Charlo to Tide Head	44.33	12	8	5	12	14	**13**
17-1	Tide Head to Robinsonville	21.03	13	2	10	6	5	**10**
17-2	Robinsonville to Whites Brook	38.21	7	5	15	5	8	**7**
17-3	Whites Brook to Restigouche County Line	31.27	3	9	9	3	4	**3**
17-4	Restigouche / Victoria County Line to Victoria / Madawaska County Line	32.66	10	3	14	2	11	**8**
17-5	Victoria / Madawaska County Line to Saint-Léonard	24.69	8	1	12	1	9	**4**

Note: Ranking indicates segment of worst (Rank 1) to best condition (Rank 15).

Table 3-8
Overall Ranking By Segment
"B"

ROUTE 11 AND ROUTE 17 NEEDS STUDY								
Segment			OVERALL RANKING					
Number	Description	Total Length (km)	Collision Rate (30%)	Passing Restrictions (10%)	Traffic Volumes (25%)	Geometric Deficiencies (25%)	Posted Speed (10%)	OVERALL RANKING
11-1	Miramichi to Burnt Church	31.17	9	15	4	11	10	11
11-2	Burnt Church to Tracadie-Sheila	34.61	4	14	7	9	3	6
11-3	Tracadie-Sheila area (County Line to Route 160)	14.87	1	6	1	10	1	2
11-4	Route 160 to Blanchard Road	20.88	5	11	6	7	6	4
11-5	Blanchard Road to Bertrand	16.29	2	4	2	8	2	1
11-6	Bertrand to Janeville	40.73	6	10	11	4	7	7
11-7	Janeville to Bathurst	19.87	15	13	13	14	12	15
11-8	Bathurst to Belledune	41.14	11	7	3	13	13	12
11-9	Belledune to Charlo	31.69	14	12	8	14	15	14
11-10	Charlo to Tide Head	44.33	12	8	5	12	14	13
17-1	Tide Head to Robinsonville	21.03	13	2	10	6	5	10
17-2	Robinsonville to Whites Brook	38.21	7	5	15	5	8	8
17-3	Whites Brook to Restigouche County Line	31.27	3	9	9	3	4	3
17-4	Restigouche / Victoria County Line to Victoria / Madawaska County Line	32.66	10	3	14	2	11	8
17-5	Victoria / Madawaska County Line to Saint-Léonard	24.69	8	1	12	1	9	5

Note: Ranking indicates segment of worst (Rank 1) to best condition (Rank 15).

Table 3-8
Overall Ranking By Segment
"B"

ROUTE 11 AND ROUTE 17 NEEDS STUDY								
Segment			OVERALL RANKING					
Number	Description	Total Length (km)	Collision Rate (30%)	Passing Restrictions (10%)	Traffic Volumes (25%)	Geometric Deficiencies (25%)	Posted Speed (10%)	**OVERALL RANKING**
11-1	Miramichi to Burnt Church	31.17	9	15	4	11	10	**11**
11-2	Burnt Church to Tracadie-Sheila	34.61	4	14	7	9	3	**6**
11-3	Tracadie-Sheila area (County Line to Route 160)	14.87	1	6	1	10	1	**2**
11-4	Route 160 to Blanchard Road	20.88	5	11	6	7	6	**4**
11-5	Blanchard Road to Bertrand	16.29	2	4	2	8	2	**1**
11-6	Bertrand to Janeville	40.73	6	10	11	4	7	**7**
11-7	Janeville to Bathurst	19.87	15	13	13	14	12	**15**
11-8	Bathurst to Belledune	41.14	11	7	3	13	13	**12**
11-9	Belledune to Charlo	31.69	14	12	8	14	15	**14**
11-10	Charlo to Tide Head	44.33	12	8	5	12	14	**13**
17-1	Tide Head to Robinsonville	21.03	13	2	10	6	5	**10**
17-2	Robinsonville to Whites Brook	38.21	7	5	15	5	8	**8**
17-3	Whites Brook to Restigouche County Line	31.27	3	9	9	3	4	**3**
17-4	Restigouche / Victoria County Line to Victoria / Madawaska County Line	32.66	10	3	14	2	11	**8**
17-5	Victoria / Madawaska County Line to Saint-Léonard	24.69	8	1	12	1	9	**5**

Note: Ranking indicates segment of worst (Rank 1) to best condition (Rank 15).

Table 3-8
Overall Ranking By Segment
"C"

ROUTE 11 AND ROUTE 17 NEEDS STUDY								
Segment			OVERALL RANKING					
Number	Description	Total Length (km)	Collision Rate (30%)	Passing Restrictions (10%)	Traffic Volumes (30%)	Geometric Deficiencies (20%)	Posted Speed (10%)	**OVERALL RANKING**
11-1	Miramichi to Burnt Church	31.17	9	15	4	11	10	8
11-2	Burnt Church to Tracadie-Sheila	34.61	4	14	7	9	3	5
11-3	Tracadie-Sheila area (County Line to Route 160)	14.87	1	6	1	10	1	1
11-4	Route 160 to Blanchard Road	20.88	5	11	6	7	6	4
11-5	Blanchard Road to Bertrand	16.29	2	4	2	8	2	2
11-6	Bertrand to Janeville	40.73	6	10	11	4	7	7
11-7	Janeville to Bathurst	19.87	15	13	13	14	12	15
11-8	Bathurst to Belledune	41.14	11	7	3	13	13	9
11-9	Belledune to Charlo	31.69	14	12	8	14	15	14
11-10	Charlo to Tide Head	44.33	12	8	5	12	14	13
17-1	Tide Head to Robinsonville	21.03	13	2	10	6	5	10
17-2	Robinsonville to Whites Brook	38.21	7	5	15	5	8	11
17-3	Whites Brook to Restigouche County Line	31.27	3	9	9	3	4	3
17-4	Restigouche / Victoria County Line to Victoria / Madawaska County Line	32.66	10	3	14	2	11	12
17-5	Victoria / Madawaska County Line to Saint-Léonard	24.69	8	1	12	1	9	6

Note: Ranking indicates segment of worst (Rank 1) to best condition (Rank 15).

Table 3-8
Overall Ranking By Segment
"C"

ROUTE 11 AND ROUTE 17 NEEDS STUDY								
Segment			OVERALL RANKING					
Number	Description	Total Length (km)	Collision Rate (30%)	Passing Restrictions (10%)	Traffic Volumes (30%)	Geometric Deficiencies (20%)	Posted Speed (10%)	OVERALL RANKING
11-1	Miramichi to Burnt Church	31.17	9	15	4	11	10	**8**
11-2	Burnt Church to Tracadie-Sheila	34.61	4	14	7	9	3	**5**
11-3	Tracadie-Sheila area (County Line to Route 160)	14.87	1	6	1	10	1	**1**
11-4	Route 160 to Blanchard Road	20.88	5	11	6	7	6	**4**
11-5	Blanchard Road to Bertrand	16.29	2	4	2	8	2	**2**
11-6	Bertrand to Janeville	40.73	6	10	11	4	7	**7**
11-7	Janeville to Bathurst	19.87	15	13	13	14	12	**15**
11-8	Bathurst to Belledune	41.14	11	7	3	13	13	**9**
11-9	Belledune to Charlo	31.69	14	12	8	14	15	**14**
11-10	Charlo to Tide Head	44.33	12	8	5	12	14	**13**
17-1	Tide Head to Robinsonville	21.03	13	2	10	6	5	**10**
17-2	Robinsonville to Whites Brook	38.21	7	5	15	5	8	**11**
17-3	Whites Brook to Restigouche County Line	31.27	3	9	9	3	4	**3**
17-4	Restigouche / Victoria County Line to Victoria / Madawaska County Line	32.66	10	3	14	2	11	**12**
17-5	Victoria / Madawaska County Line to Saint-Léonard	24.69	8	1	12	1	9	**6**

Note: Ranking indicates segment of worst (Rank 1) to best condition (Rank 15).

Table 3-8
Overall Ranking By Segment
"D"

ROUTE 11 AND ROUTE 17 NEEDS STUDY								
Segment			OVERALL RANKING					
Number	Description	Total Length (km)	Collision Rate (30%)	Passing Restrictions (15%)	Traffic Volumes (25%)	Geometric Deficiencies (20%)	Posted Speed (10%)	OVERALL RANKING
11-1	Miramichi to Burnt Church	31.17	9	15	4	11	10	12
11-2	Burnt Church to Tracadie-Sheila	34.61	4	14	7	9	3	6
11-3	Tracadie-Sheila area (County Line to Route 160)	14.87	1	6	1	10	1	2
11-4	Route 160 to Blanchard Road	20.88	5	11	6	7	6	5
11-5	Blanchard Road to Bertrand	16.29	2	4	2	8	2	1
11-6	Bertrand to Janeville	40.73	6	10	11	4	7	7
11-7	Janeville to Bathurst	19.87	15	13	13	14	12	15
11-8	Bathurst to Belledune	41.14	11	7	3	13	13	11
11-9	Belledune to Charlo	31.69	14	12	8	14	15	14
11-10	Charlo to Tide Head	44.33	12	8	5	12	14	13
17-1	Tide Head to Robinsonville	21.03	13	2	10	6	5	8
17-2	Robinsonville to Whites Brook	38.21	7	5	15	5	8	8
17-3	Whites Brook to Restigouche County Line	31.27	3	9	9	3	4	3
17-4	Restigouche / Victoria County Line to Victoria / Madawaska County Line	32.66	10	3	14	2	11	10
17-5	Victoria / Madawaska County Line to Saint-Léonard	24.69	8	1	12	1	9	4

Note: Ranking indicates segment of worst (Rank 1) to best condition (Rank 15).

Table 3-8
Overall Ranking By Segment
"D"

ROUTE 11 AND ROUTE 17 NEEDS STUDY								
Segment			OVERALL RANKING					
Number	Description	Total Length (km)	Collision Rate (30%)	Passing Restrictions (15%)	Traffic Volumes (25%)	Geometric Deficiencies (20%)	Posted Speed (10%)	**OVERALL RANKING**
11-1	Miramichi to Burnt Church	31.17	9	15	4	11	10	**12**
11-2	Burnt Church to Tracadie-Sheila	34.61	4	14	7	9	3	**6**
11-3	Tracadie-Sheila area (County Line to Route 160)	14.87	1	6	1	10	1	**2**
11-4	Route 160 to Blanchard Road	20.88	5	11	6	7	6	**5**
11-5	Blanchard Road to Bertrand	16.29	2	4	2	8	2	**1**
11-6	Bertrand to Janeville	40.73	6	10	11	4	7	**7**
11-7	Janeville to Bathurst	19.87	15	13	13	14	12	**15**
11-8	Bathurst to Belledune	41.14	11	7	3	13	13	**11**
11-9	Belledune to Charlo	31.69	14	12	8	14	15	**14**
11-10	Charlo to Tide Head	44.33	12	8	5	12	14	**13**
17-1	Tide Head to Robinsonville	21.03	13	2	10	6	5	**8**
17-2	Robinsonville to Whites Brook	38.21	7	5	15	5	8	**8**
17-3	Whites Brook to Restigouche County Line	31.27	3	9	9	3	4	**3**
17-4	Restigouche / Victoria County Line to Victoria / Madawaska County Line	32.66	10	3	14	2	11	**10**
17-5	Victoria / Madawaska County Line to Saint-Léonard	24.69	8	1	12	1	9	**4**

Note: Ranking indicates segment of worst (Rank 1) to best condition (Rank 15).

Table 3-8
Overall Ranking By Segment
"E"

ROUTE 11 AND ROUTE 17 NEEDS STUDY								
Segment			OVERALL RANKING					
Number	Description	Total Length (km)	Collision Rate (30%)	Passing Restrictions (15%)	Traffic Volumes (20%)	Geometric Deficiencies (25%)	Posted Speed (10%)	OVERALL RANKING
11-1	Miramichi to Burnt Church	31.17	9	15	4	11	10	11
11-2	Burnt Church to Tracadie-Sheila	34.61	4	14	7	9	3	7
11-3	Tracadie-Sheila area (County Line to Route 160)	14.87	1	6	1	10	1	2
11-4	Route 160 to Blanchard Road	20.88	5	11	6	7	6	5
11-5	Blanchard Road to Bertrand	16.29	2	4	2	8	2	1
11-6	Bertrand to Janeville	40.73	6	10	11	4	7	6
11-7	Janeville to Bathurst	19.87	15	13	13	14	12	15
11-8	Bathurst to Belledune	41.14	11	7	3	13	13	11
11-9	Belledune to Charlo	31.69	14	12	8	14	15	14
11-10	Charlo to Tide Head	44.33	12	8	5	12	14	13
17-1	Tide Head to Robinsonville	21.03	13	2	10	6	5	10
17-2	Robinsonville to Whites Brook	38.21	7	5	15	5	8	9
17-3	Whites Brook to Restigouche County Line	31.27	3	9	9	3	4	3
17-4	Restigouche / Victoria County Line to Victoria / Madawaska County Line	32.66	10	3	14	2	11	8
17-5	Victoria / Madawaska County Line to Saint-Léonard	24.69	8	1	12	1	9	4

Note: Ranking indicates segment of worst (Rank 1) to best condition (Rank 15).

Table 3-8
Overall Ranking By Segment
"E"

ROUTE 11 AND ROUTE 17 NEEDS STUDY								
Segment			OVERALL RANKING					
Number	Description	Total Length (km)	Collision Rate (30%)	Passing Restrictions (15%)	Traffic Volumes (20%)	Geometric Deficiencies (25%)	Posted Speed (10%)	**OVERALL RANKING**
11-1	Miramichi to Burnt Church	31.17	9	15	4	11	10	**11**
11-2	Burnt Church to Tracadie-Sheila	34.61	4	14	7	9	3	**7**
11-3	Tracadie-Sheila area (County Line to Route 160)	14.87	1	6	1	10	1	**2**
11-4	Route 160 to Blanchard Road	20.88	5	11	6	7	6	**5**
11-5	Blanchard Road to Bertrand	16.29	2	4	2	8	2	**1**
11-6	Bertrand to Janeville	40.73	6	10	11	4	7	**6**
11-7	Janeville to Bathurst	19.87	15	13	13	14	12	**15**
11-8	Bathurst to Belledune	41.14	11	7	3	13	13	**11**
11-9	Belledune to Charlo	31.69	14	12	8	14	15	**14**
11-10	Charlo to Tide Head	44.33	12	8	5	12	14	**13**
17-1	Tide Head to Robinsonville	21.03	13	2	10	6	5	**10**
17-2	Robinsonville to Whites Brook	38.21	7	5	15	5	8	**9**
17-3	Whites Brook to Restigouche County Line	31.27	3	9	9	3	4	**3**
17-4	Restigouche / Victoria County Line to Victoria / Madawaska County Line	32.66	10	3	14	2	11	**8**
17-5	Victoria / Madawaska County Line to Saint-Léonard	24.69	8	1	12	1	9	**4**

Note: Ranking indicates segment of worst (Rank 1) to best condition (Rank 15).